# Essays on Political Accountability and Representation

Thesis by Jacob Morrier

In Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

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## ABSTRACT

This dissertation studies political accountability and representation, two fundamental principles of democratic government. It consists of four independent chapters, each structured as an academic article that addresses a distinct research question. The chapters are organized into two thematic sections. On the one hand, Chapters 1 and 2 study the Question Period, a key institution in Canadian politics, analyzing the behavior of its participants and its role in upholding political accountability and representation. In particular, Chapter 1 assesses how responsive politicians are to the public salience of climate change in determining which topics to address in their Question Period interventions. Chapter 2 proposes a new approach for measuring the quality of answers in political question-and-answer sessions with large language models, using the Question Period as a case study. On the other hand, Chapters 3 and 4 explore the tensions that may arise between political accountability and representation in a context of asymmetric information using theoretical models of political agency with adverse selection. Chapter 3 demonstrates that endogenous challenger entry generally weakens electoral accountability but may paradoxically improve policymaking and voter welfare. Chapter 4 investigates how candidates for elected office can strategically weaken electoral accountability by voluntarily pledging to self-imposed term limits to their benefit and that of voters.

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## INTRODUCTION

#### Motivation

Democracy is a system of government wherein political authority resides with the people. In Ancient Greece, democracy took a direct form, with citizens actively participating in decision-making without filters or intermediaries. As the population grew, suffrage expanded, and issues became more complex, democracy shifted towards a primarily representative model, in which citizens elect representatives to deliberate and make decisions on their behalf. Direct democracy persists in the form of occasional referenda.

Despite this evolution, people's will remains the basis of political authority in a democracy. In this context, representation—the principle that elected officials must act faithfully in the best interests and according to the preferences of their constituents—embodies the promise of democracy, with accountability—the ability of citizens to reward or sanction their representatives based on their past behavior—serves as the primary mechanism for upholding it.

Because of their importance to democratic government, political accountability and representation are key areas of interest for economics, political science, and the social sciences. This dissertation investigates these principles with various cutting-edge methodologies: causal inference, game theory, and machine learning.

#### Plan

This dissertation consists of four chapters, each structured as an academic article investigating a distinct research question.

The first two chapters, stemming from empirical research performed in collaboration with R. Michael Alvarez, study the Question Period in the Canadian House of Commons. In Chapter 1, we investigate how politicians respond to the public salience of policy issues when choosing which topics to address, with a focus on climate change. To measure the attention devoted by political parties to policy issues, we analyze the Question Period transcripts from April 2006 to June 2021. We measure the public salience of policy issues using data from Google Trends. With an instrumental variable estimation strategy, we causally estimate the extent to which the public salience of climate change affects elite attention. Our findings indicate that the attention political parties devote to this issue is significantly responsive to the public salience of climate change, though with notable partisan variations.

Also, we uncover evidence that the Liberal Party of Canada effectively increased the public salience of climate change during its tenure in government.

In Chapter 2, we propose a new approach for measuring the quality of answers in political question-and-answer sessions, using the Question Period as a case study. We assess the quality of an answer based on how easily and accurately it can be recognized among a random set of candidate answers given the question's text. This measure reflects the answer's relevance and depth of engagement with the question. Drawing a parallel with semantic search, we can implement this approach by training a language model on the corpus of observed questions and answers without additional human-labeled data. We showcase and validate our methodology within the context of the Question Period in the Canadian House of Commons. Our analysis reveals that while some answers only have a weak semantic connection to questions, suggesting some evasion or obfuscation, they are generally at least moderately relevant, far exceeding what we would expect from random replies. We also find meaningful correlations between the quality of answers and the party affiliation of the members of Parliament asking the questions.

The last two chapters, stemming from independent research, analyze theoretical models of electoral accountability with adverse selection. They explore the tensions that may arise between political accountability and representation in the context of asymmetric information, where voters do not have as much information as their representatives. In Chapter 3, I investigate the effect of endogenous challenger entry on electoral accountability. To this end, I formulate a two-period electoral agency model wherein a potential challenger freely chooses whether to run for office. The effect of endogenous challenger entry on policy decisions in this model is ambiguous: depending on model parameters, it can worsen or alleviate policy distortions. Analogously, marginally increasing the cost of running for office can amplify or reduce these distortions. This uncertainty regarding the effect of endogenous challenger entry on policymaking leads to equally ambiguous welfare implications. Nevertheless, I identify conditions under which endogenous challenger entry improves voter welfare.

In Chapter 4, I consider how self-imposed term limits—voluntary pledges by candidates for elected office to step down at the end of their term if elected or reelected can arise endogenously within a formal model of electoral accountability. To this end, I extend a standard two-period political agency model by appending an election campaign during which two candidates compete with the option to commit not to seek reelection. I show that term limit pledges can emerge in equilibrium without commitment power, revealing their relationship with informative cheap talk. The subsequent analysis considers scenarios where commitment power is necessary for upholding term limit pledges. In these cases, self-imposed term limits allow strong candidates to signal their private type to voters, giving them an electoral advantage over those seeking reelection. However, these candidates' appeal comes not from the informational content of their pledges but from their ability to make policy decisions free from career considerations. I characterize the equilibria of a model specification in which politicians have differing policy preferences, identifying conditions under which term limit pledges are simultaneously informative and improve voter welfare.

#### Contributions

These essays contribute to the study of political accountability and representation by mobilizing a unique combination of methodologies at the cutting edge of social science. On the one hand, Chapters 1 and 2 deepen our understanding of the Question Period, a prominent but understudied institution in Canadian politics, shedding light on its participants' behavior and its role in upholding political accountability and representation. Our findings show that members of Parliament actively address citizens' concerns during the Question Period, which also proves effective in eliciting relevant responses from government ministers. The methodological advancements presented in Chapter 2 extend beyond the Question Period, addressing a critical void in the analysis of transcripts from question-and-answer sessions regardless of the context. On the other hand, Chapters 3 and 4 illustrate the tensions that may arise between political accountability and representation in the context of asymmetric information. In this context, mechanisms that a priori weaken electoral accountability can paradoxically improve policymaking and voter welfare. In particular, Chapter 3 deepens our understanding of electoral accountability by challenging conventional assumptions with a provocative implication: in some circumstances, imposing higher barriers to entry in elections can better align policymaking with voters' preferences and improve voter welfare. Also, Chapter 4 demonstrates how candidates for elected office can strategically leverage the tensions between political accountability and representation by voluntarily weakening electoral accountability for their benefit and that of voters.

#### Chapter 1

## ISSUE RESPONSIVENESS IN CANADIAN POLITICS: ARE PARTIES RESPONSIVE TO THE PUBLIC SALIENCE OF CLIMATE CHANGE IN THE QUESTION PERIOD?

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#### 1.1 Introduction

Are politicians responsive to public opinion? This question undeniably stands as one of the most prominent subjects of interest in political science. Consequently, it lies at the core of a substantial body of research. The answer to this question carries significant normative implications for the effective functioning of representative democracy, as it is widely acknowledged that it requires political elites to be somewhat responsive to public opinion.

Prior research on political representation has established that political elites are generally responsive to public opinion. However, many questions remain unanswered. Firstly, although a considerable amount of research has been dedicated to assessing the congruence between the policy positions of political representatives and the preferences of the public, commonly referred to as "policy responsiveness," our comprehension of "issue responsiveness" remains limited. Issue responsiveness is characterized by the extent to which the issues that politicians focus on is proportional to the public salience attached to those issues, irrespective of the specific positions politicians adopt on those matters (Barberá et al., 2019; Klüver & Spoon, 2016; Spoon & Klüver, 2014; Wagner & Meyer, 2014). Secondly, a considerable portion of the research on political representation has focused on the United States and its unique political institutions, potentially limiting its generalizability to countries with different systems, such as multi-party and parliamentary systems (Shapiro, 2011). Thirdly, most of the previous studies have been correlational in nature, lacking the ability to make causal claims. Finally, very few studies have addressed political elites' responsiveness concerning one of the most pressing issues of our time: climate change.

This paper aims to provide answers to these lingering questions. Our study focuses on the issue responsiveness of political parties within the context of a multi-party parliamentary system, specifically the Canadian House of Commons, spanning a fifteen-year period from April 2006 to June 2021. We examine the extent to which parties' emphasis on climate change corresponds to its public salience. Additionally, we explore potential variations in issue responsiveness across different parties. Our analysis combines machine learning techniques with conventional causal inference methods to generate causal estimates of issue responsiveness.

We have chosen to focus our analysis on Canada for several reasons. Similar to many developed nations, climate change has gained significant attention in Canada over the past decade as citizens have witnessed the tangible effects of a changing climate, including notable variations in temperature, precipitation, snow, ice, permafrost, and sea levels. Additionally, the production of fossil fuels remains a crucial aspect of the Canadian economy, positioning it as the world's fourth largest oil producer and sixth largest natural gas producer. Canada, like most Western democracies except for the United States, operates within a multi-party system (Johnston, 2017). The current party system revolves around three national political parties: the right-wing Conservative Party (CPC), the center-leaning Liberal Party (LPC), and the leftwing New Democratic Party (NDP). Climate change remains a contentious issue, with noticeable partisan differences in attitudes towards it. We expect this partisan heterogeneity to manifest in varying levels of issue responsiveness among parties, influenced by their respective issue ownership and institutional roles.

We employ cutting-edge approaches to measuring issue attention and salience. Specifically, we quantify the public salience of policy issues through their relative popularity on Google's search engine. Additionally, we evaluate the attention political parties allocate to these issues by analyzing the topic composition of interventions made by their members during the Question Period. These metrics provide representative indicators of the attention that politicians and the public give to policy issues. Additionally, the use of web search data helps mitigate certain biases that have affected previous survey studies on issue salience.

The Question Period holds significant importance in the political landscape of Canada. Taking place whenever the House of Commons convenes, it garners extensive media coverage. Its primary objective is to provide Members of Parliament, particularly those from opposition parties, a platform to inquire about current issues and hold government ministers responsible for their actions. The dynamics

of political parties' behavior during the Question Period, especially regarding their choice of topics to address, remain poorly understood. This paper aims to fill this knowledge gap. As various parliamentary institutions adopt similar procedures, the insights derived from this study are relevant and applicable to other countries as well (Bevan & John, 2016; Borghetto & Russo, 2018; Green-Pedersen & Mortensen, 2010; Vliegenthart & Walgrave, 2011).

From a methodological perspective, this paper showcases the utilization of machine learning in conjunction with traditional causal identification techniques to address substantive questions in political science. Our paper is part of the expanding body of research that leverages natural language processing methods to analyze parliamentary speeches (Abercrombie & Batista-Navarro, 2020; Cochrane et al., 2022; Guber et al., 2021; Rheault et al., 2016). While the majority of this literature has centered around the United States and the United Kingdom, our study extends its scope beyond these two countries. We use the resulting measures to carry out standard causal analysis.

Estimating issue responsiveness presents a considerable challenge due to simultaneous causality. Indeed, the public salience of policy issues can be influenced by, as well as influence, their prevalence in Question Period interventions. To neutralize this potential source of endogeneity, we adopt an instrumental variables estimation strategy. Specifically, we use the public salience of climate change in the United States as an instrument for the public salience of climate change in Canada. By employing this identification strategy, we can establish causal relationships and draw reliable conclusions regarding issue responsiveness.

Our findings indicate that Canada's three major national political parties adapt the topics they address during the Question Period to align with the public salience of climate change. There is considerable partisan heterogeneity in this behavior. Furthermore, our analysis reveals that the Question Period, by granting agenda-setting authority to opposition parties, effectively prompts the government to address challenging or potentially embarrassing issues. Lastly, we provide evidence suggesting that the Liberal Party of Canada, while in power, successfully increased the public salience of climate change.

A study closely aligned with ours was conducted by Penner et al. (2006). Similarly to us, they explore the relationship between the attention parties give to policy issues during the Question Period and the public salience of those issues. Their findings align with our conclusions, indicating that the attention dedicated to policy issues is consistent with their public salience, although there is variation across partisan groups. However, our study builds and improves upon their work in several significant ways. Firstly, while their analysis relies on correlation, we employ an identification strategy that allows us to establish causal relationships regarding issue responsiveness. Additionally, while they employ manual coding to estimate the topic composition of Question Period interventions, we utilize unsupervised machine learning techniques. Lastly, our study extends their work by specifically focusing on the topic of climate change, which was not included in their analysis. Overall, this paper provides a valuable contribution by introducing and implementing a methodology that not only replicates but also confirms the causal nature of the existing substantive findings in the literature.

Research has also been devoted to studying the influence of the media on politicians' agenda, particularly regarding the topics discussed during the Question Period (Soroka, 2000, 2002). This literature also finds a strong relationship between the public salience of climate change and the attention political parties pay to that issue. However, it emphasizes the mediating role of the media in this relationship. The influence of the media on the Question Period is evident, as Members of Parliament systematically review news headlines to determine the questions they will pose to the government. More generally, the media plays a crucial role in two aspects: firstly, by conveying the concerns of the public to politicians, and secondly, by relaying politicians' actions and speeches to the public. Acting as a conduit between politicians and the public, the media possesses the power to shape and distort the public's and politicians' sense of priorities. Hence, it is crucial to recognize and take into account, whenever possible, the influential role exerted by the media.

The remainder of this article is structured as follows. In the next section, we establish the theoretical framework for studying issue responsiveness and formulate hypotheses regarding its determinants. Subsequently, we provide an overview of the data sources and methodology employed in our analysis. Finally, we present our findings and discuss their implications for the broader understanding of political representation and issue responsiveness.

#### **1.2** The Relevance of Issue Responsiveness

Considerable attention has been devoted to investigating policy responsiveness, which examines the congruence between the policy positions of politicians and the preferences of their constituents (Achen & Bartels, 2017; Burstein, 2003; Canes-

Wrone, 2005; Canes-Wrone & Shotts, 2004; Caughey & Warshaw, 2018; Erikson et al., 2001; Manza & Lomax Cook, 2002; Page & Shapiro, 1983; Shapiro, 2011; Stimson et al., 1995). However, political competition involves more than just divergent policy positions. Politicians also assign varying levels of attention and importance to policy issues. We argue that issue responsiveness, which measures how politicians adjust the attention they give to policy issues in response to shifts in their public salience, deserves as much attention from political scientists as policy responsiveness. This assertion is particularly valid for two reasons.

Firstly, given the scarcity of time and attention, the choices made by officeholders regarding which issues to address from the universe of policy matters are just as crucial in determining the degree to which policy outcomes align with the preferences of their constituents as the specific actions they take on those issues. As stated by Barberá et al. (2019, p. 885), "[f]or politicians to be truly responsive to the public, they first need to pay attention to the issues [their] constituents deem relevant, and then their actions must reflect people's preferences on those issues."

Secondly, political competition largely revolves around the relative importance of issues on the public agenda, particularly in the short term. In fact, it is easier for political actors to modify the attention they assign to policy issues rather than completely change their positions on each individual issue. Over time, politicians develop a reputation for competence in handling specific issues, and parties and candidates eventually become associated with certain policy domains (Bélanger & Meguid, 2008; Egan, 2013; Petrocik, 1996; Stubager, 2018). This reputation is shaped, among other factors, by politicians' track record in office and their previous investments in expertise. Its influence is amplified by the fact that many voters do not actively engage in staying updated on the latest political developments, often relying on long-held beliefs and preconceived notions when making choices. While it is challenging for political actors to rapidly alter their reputation, they can strategically emphasize specific aspects of it. For instance, consider a party that has gained a reputation for competence in handling education and healthcare. In the short term, this party can choose to highlight one of these policy issues over the other and emphasize both of them more than other issues.

#### **1.3** Partisan Heterogeneity in Issue Responsiveness

Attitudes towards climate change vary significantly among the three primary national political parties in Canada (Mildenberger et al., 2016). Notably, the Conservative



Figure 1.1: Distribution of Voters' Views on Climate Change and Its Main Cause by Party Preference in the 2019 Federal Election

Party is widely perceived to hold a weaker position and possess a weaker reputation along this policy dimension compared to the Liberal Party and the New Democratic Party. Figure 1.1 presents data from the 2019 Canadian Election Study, indicating that respondents who reported voting for the Conservative Party in October 2019 were less likely to acknowledge the existence of climate change compared to those who voted for the Liberal Party or the New Democratic Party (Stephenson et al., 2021). Furthermore, among those who acknowledged climate change, Conservative supporters were less inclined to believe that human activities are its primary cause, which represents the scientific consensus, and more inclined to attribute it to natural changes. Finally, in March 2021, despite advocacy from the party's leader, 54% of delegates at the Conservative Party's policy convention voted against a resolution recognizing the threat posed by climate change.

While all political parties share an incentive to align their policy priorities with salient issues, the presence of partian heterogeneity in attitudes towards climate change is likely to result in varying degrees of issue responsiveness among these parties. Specifically, we expect that issue responsiveness will differ based on issue ownership and the institutional roles of political parties.

Firstly, previous research suggests that the attention parties give to policy issues is contingent upon their reputation regarding those issues. In particular, parties are unlikely to draw attention to problems for which they have a weak reputation, as doing so would highlight their opponents' strengths and undermine their own position. All else being equal, parties tend to selectively emphasize issues about which they have a stronger reputation and neglect those about which their reputation is weaker. This principle is commonly referred to as the "Dominance Principle" (Damore, 2004; Petrocik, 1996; Sides, 2006). Analogously, we posit that the incentives for a party to discuss an issue that gains sudden salience are stronger when that party "owns" the issue. Conversely, we expect parties for which climate change is a vulnerability to be less responsive to shifts in its public salience. In our specific institutional context, this means that we anticipate the Conservative Party to address climate change to a lesser extent and be less responsive to fluctuations in its public salience compared to the Liberal and New Democratic parties.

The issue responsiveness of parties should also be influenced by their institutional role. During the Question Period, the opposition determines the topics of questions and can compel the government to address issues that it might otherwise disregard due to their disadvantageous or embarrassing nature (Bevan & John, 2016). From a strategic standpoint, it is advantageous for a party seeking to improve its electoral prospects to raise policy issues about which its opponents have a weak reputation or that could potentially demean them. However, the government has the ability to counter these tactics and shape the debate in a more favorable manner. Indeed, as "[t]here [are] no explicit rules governing the form or content of replies to oral questions" beyond very general "standards of order, decorum and parliamentary language," government ministers have significant freedom in choosing how to respond (Bosc & Gagnon, 2017, Chapter 11). In theory, an answer in the Question Period is simply an opportunity for a minister to make a 45-second statement, and its relevance to the question posed is incidental. For instance, it is not uncommon for a minister to dismiss the issue raised by their opponent as irrelevant and shift the discussion towards a more favorable topic. Although the government may be reluctant to provide candid responses to inquiries regarding issues about which it has a weak reputation, outright refusal to address pertinent questions could have detrimental consequences in the long term. Consequently, we posit that the government will yield to some of the pressures from the opposition and address certain embarrassing topics. Specifically, we expect that the Conservative Party, during its tenure in government, will exhibit a higher level of responsiveness to the public salience of climate change compared to its time in opposition.

#### **1.4 Data and Measurement**

Our analysis relies on two dynamic data sets: one that quantifies the temporal evolution of the public salience of climate change, and another that tracks the attention devoted by political parties to this issue in their interventions during the Question Period.

#### **Public Salience**

To monitor the evolution of the public salience of policy issues, we rely on Google Trends data. This data set is derived from a sample of all queries conducted on Google's search engine and is extensively used across various disciplines, including epidemiology, finance, and marketing. The data is presented in the form of an index, which tracks the relative changes in the interest of users in predefined topics or specific keywords over time. To enable meaningful comparisons across various topics, time periods, and geographic regions, the data points are normalized using the total search volume for a specific topic within a particular region at a given time.

The operationalization and measurement of issue salience have been long-standing challenges (Moniz & Wlezien, 2020; Wlezien, 2005). In our study, we utilize Google Trends as a measurement tool for assessing issue salience, which we believe offers several advantages over alternative methods. Firstly, Google Trends provides data at frequent intervals, including daily, weekly, and monthly, allowing us to capture the dynamics of issue salience. Furthermore, it enables us to analyze issue salience across different geographic entities, ranging from metropolitan areas to provinces, states, territories, and even countries. Obtaining this level of granularity through survey studies would be prohibitively costly. In our analysis, we specifically employ weekly data.<sup>1</sup>

Secondly, Google Trends data is derived directly from users' behavior, which helps mitigate some of the biases that typically affect survey responses (e.g., social desirability bias, subject-expectancy bias). It captures variations in public salience

<sup>&</sup>lt;sup>1</sup>To overcome the inability to directly extract weekly data from Google Trends for periods longer than five years, we constructed our time series by extracting data from multiple overlapping five-year periods. We then combined and standardized the resulting series on a common scale (Tseng, 2019).

as manifested in web search behavior. In this regard, we believe that the act of searching for information on a policy issue reflects a genuine level of concern and interest. Given the scarcity of time and attention, individuals are unlikely to invest effort in researching problems they deem irrelevant. Therefore, we anticipate that users will actively seek more information on the issues they are most invested in and care about deeply.

Thirdly, the conventional approach of asking survey respondents "What is the most important issue facing the country?" has limitations as it only elicits a single response at a time. In contrast, Google Trends data considers all possible topics simultaneously and aims to gauge the relative interest of the public in each topic. Therefore, our measurement approach offers a more comprehensive portrayal of issue salience.

Undoubtedly, Google Trends data also come with certain limitations (Mellon, 2013). One primary concern is the representativeness of Google's user base, which may not accurately reflect the broader electorate or general public due to variations in Internet usage across socio-demographic groups. Additionally, there could have been changes in the composition of Google Search's user base, making it challenging to generalize findings beyond the observed sample. However, previous studies have demonstrated that Google Trends can provide reliable measures of public salience, alleviating some of these concerns (Mellon, 2014; Reilly et al., 2012; Ripberger, 2011; Swearingen & Ripberger, 2014).

In our analysis, we utilize the predefined "climate change" topic provided by Google Trends. We consider the resulting variable as an indicator of the public salience of climate change. The evolution of this variable in Canada and the United States is depicted in Figure 1.2.

#### **Attention from Political Parties**

To measure the attention that political parties pay to policy issues, we collected and analyzed the transcripts of every Question Period conducted in the Canadian House of Commons from the 39<sup>th</sup> to the 43<sup>rd</sup> legislature. This period spans from the election held on January 23, 2006, to the election held on September 20, 2021. Our data set is derived from the official English transcripts published by the Clerk of the House of Commons, which include professionally translated versions of the interventions originally delivered in French.



Country — Canada ---- United States

Figure 1.2: Weekly Evolution of the Public Salience of Climate Change in Canada and the United States

The House of Commons serves as the lower chamber of the Parliament of Canada and is where the Prime Minister and other federal Cabinet ministers hold their seats. A significant event in Canadian political life is the Question Period, which takes place for 45 minutes each day the House is in session and garners close attention from the media and public. This segment serves as a crucial opportunity for Members of Parliament to seek information on current issues and hold the government accountable for its actions. Notably, it is one of the rare instances in Parliament where the opposition, rather than the government, exerts control over the topics that are discussed.

The Question Period typically begins with the Speaker granting the Leader of the Opposition the opportunity to ask questions, often directed at the Prime Minister. Subsequent questions are then posed in a predetermined rotation based on the parties' representation in the House. While backbench members of the governing party and independent members also have the chance to ask questions, their participation is

generally less frequent compared to officially-recognized opposition parties.<sup>2</sup> The party caucuses and their whips manage participation in the Question Period. They determine which members from their respective parties will take part and provide the Speaker's Office with a list of names and a suggested order of recognition. The government possesses the discretion to determine which of its members will provide a response to a question, and in line with the principle of collective responsibility, any minister may answer a question directed at one of them.

Our analysis focuses exclusively on the interventions emanating from Canada's three main national political parties. These parties are the only ones that maintained official party status throughout our entire period of study. The Conservative Party held the position of the governing party from January 2006 until October 2015 and has since served as the official opposition.<sup>3</sup> The Liberal Party held the position of the official opposition from January 2006 to May 2011, transitioned to third-party status from May 2011 to October 2015, and has been in government since then. Lastly, the New Democratic Party maintained third-party status for the majority of our period of study, except from May 2011 to October 2015 when it held the status of the official opposition.

From January 2006 to May 2011 and again from October 2019 onwards, the Bloc Québécois, a regionalist party, held third-party status. However, since the Bloc Québécois did not maintain official party status throughout our period of study, our data on their attention to issues is limited between May 2011 and October 2019. Moreover, since the Bloc Québécois represents only one of Canada's ten provinces, the issues they raise are likely influenced by factors specific to that province, which may not be adequately captured by our national measure of public salience. Considering the complexities and nuances associated with the case of the Bloc Québécois, we will defer its analysis to future research.

An alternative source of data for measuring the attention parties give to issues would be their party platforms. Question Period interventions offers several advantages over this alternative approach. Firstly, the Question Period occurs more frequently compared to the publication of party platforms, which typically happens only once during a general election. By analyzing Question Period interventions, we can assess the attention parties give to various policy issues on a weekly basis for most of the year. This is because the House of Commons sits quasi-continuously from late

<sup>&</sup>lt;sup>2</sup>A party must have a minimum of twelve Members of Parliament to be officially recognized.

<sup>&</sup>lt;sup>3</sup>The largest opposition party assumes the role of the official opposition, with its leader becoming the Leader of the Opposition, while smaller opposition parties hold third-party status.

January to June and from late September to mid-December. Secondly, during the Question Period, parties face limited opportunities to address issues, necessitating careful selection of topics. In contrast, parties face no limitations on the length of their party platforms, which can result in a noisy distribution of topics that may not accurately reflect the parties' actual priorities.

We posit that the topics addressed by parties in their Question Period interventions reflect the level of attention they allocate to policy issues. To analyze the latent topic composition of the inherently high-dimensional text data, we employ the Latent Dirichlet Allocation (LDA) model (Blei et al., 2003; Grimmer & Stewart, 2013; Grimmer et al., 2021). This unsupervised machine learning algorithm is widely used by social scientists to identify the latent topics present in a collection of documents and assign each document to the relevant topics. We estimate the LDA model using the implementation provided by the stm package in R (Roberts et al., 2014).

The LDA model is a mixed-membership model, which operates on the assumption that: (i) each document is a combination of multiple topics, and (ii) each topic is a probability distribution over words, allowing a particular term to be associated with multiple topics. In this model, documents are treated as "bags of words," where the syntax and word order are disregarded, and only the frequency of words is considered.

We consider every intervention, whether it takes the form of a question or an answer, as a separate document. In order to obtain meaningful and coherent results, it is essential to preprocess these documents appropriately before conducting the estimation (Denny & Spirling, 2018). First, we remove all numbers, punctuation marks, and unnecessary white spaces from the documents. Next, we convert all remaining terms to lowercase and apply Porter's stemming algorithm to reduce words to their root form. Lastly, to identify the terms that provide the most distinguishing information for the various topics, we eliminate "stop words" that are unlikely to convey significant meaning. We only retain tokens that occur in a range of one to 25% of the documents, ensuring that we focus on terms that are both informative and sufficiently prevalent in the data set.

The LDA model requires the analyst to determine the number of topics to be used. After evaluating diagnostic values for different numbers of topics, we opted for a model consisting of 15 topics. This choice was based on the model's optimal combination of held-out likelihood and semantic coherence. For reference, the diagnostic values are presented in Figures A.1 and A.2. Table A.1 showcases words representative of the estimated topics. It is worth mentioning that the resulting topics are well-defined, easily comprehensible, and possess substantial meaning. Of particular interest to our analysis is the topic related to climate change.<sup>4</sup> To provide a glimpse of the discussions pertaining to climate change, we have randomly chosen ten documents from those where the prevalence of climate change exceeds the 99<sup>th</sup> percentile. These documents can be found in Table A.2.

#### **1.5 Statistical Methodology**

#### **Model Specification**

Our objective is to estimate the causal parameter  $\beta_i$  in the following equation:

$$\underbrace{\log\left(\frac{Y_{it}}{1-Y_{it}}\right)}_{=\tilde{Y}_{it}} = \alpha_i + \beta_i \log\left(X_t\right) + \varepsilon_{it}.$$
(1.1)

In the equation,  $Y_{it}$  represents the share of Question Period interventions from party *i* related to climate change in week *t*, and  $X_t$  represents the public salience of climate change in Canada during that same week. In accordance with the standard practice in time series analysis of compositional data, we utilize the log-ratio instead of the raw share of interventions related to climate change as the dependent variable (Barberá et al., 2019). The parameter  $\beta_i$  represents the relative variation (in percentage) of the ratio of party *i*'s interventions related to climate change in response to a one-percent increase in the public salience of this issue. A positive value of  $\beta_i$  signifies that party *i* is responsive to the public salience of climate change.

#### **Identification Strategy**

The existing literature consistently demonstrates a strong correlation between the priorities of the public and the policy agenda pursued by their political representatives. On average, politicians tend to discuss policy issues that are more salient to their constituents and align with public concerns (Klüver & Spoon, 2016; Wagner & Meyer, 2014). Scholars have proposed two mechanisms to explain this relationship.

On the one hand, politicians have a strong motivation to adjust their rhetoric to address issues that are highly relevant to their constituents. Voters actively seek

<sup>&</sup>lt;sup>4</sup>Admittedly, this topic encompasses both the environment and climate change. As a result, our analysis of issue responsiveness reflects the influence of the public salience of climate change on the prevalence of both environmental and climate change discussions in Question Period interventions. Although these topics are not identical, they do share a considerable level of overlap.

politicians whose priorities align with their own, and as a result, electorally-driven politicians are inclined to shape the content of their public statements accordingly. Moreover, addressing issues that voters perceive as important allows parties and candidates to capture more attention from the electorate compared to discussing topics that are deemed less significant.

On the other hand, politicians have the ability to engage in "public agenda-setting" and influence the weight that voters assign to policy dimensions (Baumgartner & Jones, 2009; Boydstun et al., 2013; Jones & Baumgartner, 2005; Rossiter, 2021). Voters, as relatively unsophisticated actors who pay limited attention to politics, are often uncertain about what issues are truly significant and are susceptible to believing that any policy matter is important (Chong & Druckman, 2007). This susceptibility opens the door to framing and priming effects in determining the relative importance of different issues. Signals from news reports and public statements made by politicians are interpreted by voters as cues of relevance (Iyengar & Kinder, 2010; McCombs & Valenzuela, 2021). Political parties can exploit this susceptibility to influence and shape the political agenda to their liking. In fact, prior research suggests that parties dedicate significant effort to these agenda-setting efforts (Druckman & Jacobs, 2015; Jacobs & Shapiro, 1997, 2000).

The reality lies somewhere between these two conflicting theories. While voters' sense of priorities can be influenced by politicians, it is important to recognize that politicians do not have complete control over all relevant factors. External events, such as natural disasters or international incidents, can also impact the public salience of policy issues. In other words, the topic composition of Question Period interventions can be influenced by and, in turn, influence the public salience of climate change. This implies that the relationship between the attention politicians devote to policy issues and their public salience is afflicted by reverse or simultaneous causality, as both variables are jointly determined (Page, 1994). Observing the correlation between the topic composition of politicians are responsive to the public, when in reality, citizens' sense of priorities may be distorted by political rhetoric.

The presence of simultaneous causality introduces endogeneity, which can result in inconsistent estimates when employing ordinary least squares (OLS) regression. To achieve causal identification of the parameter  $\beta_i$ , we employ a two-stage least squares (2SLS) estimation strategy. Specifically, we instrument the public salience of climate change in Canada with the analogous variable for the United States:

$$\log (X_t) = \delta + \gamma \log (Z_t) + u_t$$

Here,  $Z_t$  represents the public salience of climate change in the United States during week t.

Our estimation strategy seeks to neutralize the influence of Question Period interventions on the public salience of climate change in Canada. This is accomplished by isolating variations in the public salience of climate change that occur concurrently in Canada and the United States. To ensure the validity of this approach, we must assume that Question Period interventions do not influence the public salience of climate change in the United States. Under this assumption, shared variations of the public salience of climate change between Canada and the United States can be treated as exogenous. By leveraging these shared variations, we can achieve causal identification of issue responsiveness.

Formally, the validity of this identification strategy relies on two key assumptions:

- (i) *Relevance*. The public salience of climate change in Canada and the United States are not independent;
- (ii) *Exclusion*. The public salience of climate change in the United States is exogenous conditional on the public salience of climate change in Canada.

The validity of the exclusion restriction assumption, also known as the "only through" assumption, relies on the notion that any influence exerted by the public salience of climate change in the United States on the topic composition of Question Period interventions is solely mediated by the public salience of climate change in Canada.

While these assumptions are unfalsifiable, we find them highly plausible. Given the close proximity and strong relationship between Canada and the United States, with both countries sharing the longest undefended border in the world, it is reasonable to expect that factors influencing the public salience of climate change would be similar in both countries. Figure 1.2 illustrates the relationship of the public salience of climate change in Canada and the United States, with a correlation coefficient slightly above 0.75. However, it is crucial to recognize that the United States is a significantly larger country, and its media coverage primarily revolves around

domestic politics. Hence, it is reasonable to assume that discussions in the Canadian House of Commons have a minimal impact on the public salience of climate change in the United States.

The question remains whether there are additional variables that could jointly influence Question Period interventions and the public salience of climate change in the United States, potentially leading to omitted variable bias. One possibility is that Members of Parliament might feel compelled to express sympathy for a natural disaster that occurred in the United States. We do not expect this to introduce systematic biases. In general, we find it unlikely that the public salience of climate change in the United States would directly impact Question Period interventions without this effect being mediated by the public salience of climate change in Canada. Nevertheless, we acknowledge that the flow of information between political representatives and their constituents can be influenced by other institutions, such as the media. While these institutions may filter or potentially distort information, we maintain our belief that they do not introduce confounding factors that would undermine the validity of our identification strategy.

#### Using a Latent Variable as Dependent Variable

Our identification strategy involves conducting causal analysis on the latent topic composition of Question Period interventions, which is estimated through an unsupervised machine learning algorithm. As argued by Egami et al. (2022), analyzing this variable can lead to a violation of the Stable Unit Treatment Value Assumption (SUTVA), a fundamental assumption in causal inference. SUTVA requires that there be no interference between the treatment assigned to one unit and the outcomes of other units (Imbens & Rubin, 2015, p. 10). Unfortunately, the estimation of the LDA model introduces interference across observations, since the estimated topic composition of a document typically depends on the corpus used to train the model. To address this issue, we implement the solution proposed by Egami et al. (2022). Specifically, we train the LDA model on a corpus of documents separate from the one used for the causal analysis. We randomly set aside ten percent of our entire corpus as training data. Using the trained model, we estimate the topic composition of the remaining 90% of documents and perform our analysis on the resulting time series.

#### Adjusting Our Dynamic Regression Model for Serial Correlation

Equation (1.1) describes an inherently dynamic process. However, the absence of the lagged value of the dependent variable in our model makes it vulnerable to serial correlation. Serial correlation can render the standard 2SLS estimates inconsistent and invalidate the associated inference.

To address this issue, we employ the Cochrane–Orcutt estimation procedure (Box-Steffensmeier et al., 2014, p. 77). This estimation procedure can be summarized as follows:

- (i) Estimate the model using the 2SLS method and save the residuals, denoted  $\hat{\varepsilon}$ ;
- (ii) Regress the residuals on their lagged values without an intercept:

$$\hat{\varepsilon}_t = \rho \hat{\varepsilon}_{t-1} + v_t;$$

(iii) Using the estimated serial correlation coefficient  $\hat{\rho}$ , transform the data to generate the following variables:

$$\widetilde{Y}_t^{\star} = \widetilde{Y}_t - \hat{\rho}\widetilde{Y}_{t-1}$$
$$\log (X_t)^{\star} = \log (X_t) - \hat{\rho} \log (X_{t-1});$$

- (iv) Regress  $\tilde{Y}_t^{\star}$  on log  $(X_t)^{\star}$  using 2SLS, and save the residuals to produce an updated value of  $\hat{\rho}$ ;
- (v) Repeat steps 2 to 4 until satisfactory convergence in the estimate of  $\hat{\rho}$  is achieved.

In practice, this process can be automated using the orcutt package in R (Stefano et al., 2018). It is important to note that steps 2 and 3 result in the loss of one observation at the beginning and after each interruption in the time series, as there are no lagged values available to transform these observations. As a result, the estimation relies on a reduced number of observations, which may lead to reduced statistical efficiency.

#### 1.6 Results

## **Relationship Between the Prevalence of Climate Change in Question Period Interventions and Its Public Salience**

Figure 1.3 illustrates the weekly evolution of the share of Question Period interventions focused on climate change by party, represented by colored curves, along



Figure 1.3: Weekly Evolution of Climate Change's Prevalence in Question Period Interventions and Public Salience

with the public salience of this issue in Canada, represented by a thick black curve. To emphasize the underlying trends, we present smoothed values obtained through local polynomial regression. The four curves display remarkably similar patterns, indicating a strong correlation between the topic composition of Question Period interventions and the public salience of climate change.

This finding is further supported by Figure 1.4. The figure illustrates the log-ratio of parties' interventions on climate change in a given week on the *y*-axis, while the log-measure of the public's perception of the salience of climate change in Canada during the same period is represented on the *x*-axis. These variables correspond to the independent and dependent variables, respectively, in Equation (1.1). For each of the three parties, the scatter plot includes a loess curve that demonstrates the local relationship between these variables.

Consistent with expectations, the three political parties allocate a greater proportion of their Question Period interventions to climate change when the issue is more prominent. This relationship exhibits a predominantly linear pattern, supporting



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Figure 1.4: Correlation Between Climate Change's Prevalence in Question Period Interventions and Public Salience

the functional form of Equation (1.1), with the slope being nearly identical for all parties. Furthermore, all three parties display a positive and statistically significant correlation between the two variables at a 99% confidence level. The magnitude of the correlation coefficient is greatest for the Conservative Party, followed by the New Democratic Party, and finally the Liberal Party. This indicates that variations in the topic composition of Question Period interventions are most accurately predicted by the public salience of climate change for the Conservatives, while other factors play a relatively larger role in predicting the topic composition of Question Period interventions and by the Liberals and New Democrats.

While the previous findings indicate a positive correlation between the public salience of climate change and the share of Question Period interventions related to climate change, it is crucial to note that, at this stage, we cannot assert that parties are responsive to the public's policy priorities, nor can we provide a causal estimate of this responsiveness. As mentioned earlier, the topic composition of interventions may explain as much as it is explained by the public salience of climate change. This can be observed in Figure 1.3, where the four curves closely align with each

other. However, at this point, we are unable to ascertain the extent to which each party's curve specifically responds to public salience. The identification strategy we outlined will allow us to address this issue.

In Figure 1.3, we have indicated the occurrences of elections during our period of study with dotted vertical lines. Notably, the relationship between the proportion of Question Period interventions dedicated to climate change by the Conservative Party and the public salience of climate change seems to diminish following the 2015 election when the party transitioned from government to opposition. As a result, a clear divergence arises between the curve representing the topic composition of the Conservative Party's Question Period interventions and those of the other parties. This divergence suggests that, during their tenure in government, the Liberal Party discussed climate change significantly more than the official opposition. This finding supports the notion that government ministers possess considerable flexibility in shaping their answers to the opposition's questions.

#### **Estimates of Issue Responsiveness**

Table 1.1 displays the estimation results for Equation (1.1). The table includes OLS and 2SLS estimates for four different model specifications, differing in two dimensions: (i) whether partisan heterogeneity in issue responsiveness is permitted, and (ii) whether issue responsiveness is allowed to differ before and after the 2015 election, when the Liberal Party replaced the Conservative Party in government. Columns (1) to (4) display the OLS estimates, while columns (5) to (8) present the 2SLS estimates. Columns (1) and (5) provide estimates of the average issue responsiveness of all three parties throughout the entire period of study. Columns (2) and (6) focus on estimates of the issue responsiveness of individual parties over the entire period. Columns (3) and (7) present estimates of parties' average issue responsiveness before and after the 2015 election. Finally, columns (4) and (8) offer estimates of the issue responsiveness of individual parties before and after 2015. The results in columns (3), (4), (7), and (8) allow us to assess whether the change in government in 2015 led to a structural break in issue responsiveness.

We would like to emphasize three findings. Firstly, all parties exhibit issue responsiveness by adjusting the topic composition of their Question Period interventions in response to exogenous variations in the public salience of climate change. As shown in column (5), on average, the ratio of a party's Question Period interventions related to climate change increases by 0.4% following a one percent increase in the
		10	Ś			5SL	S	
	(1)	(2)	(3)	(4)	(5)	(9)	(7)	(8)
$\log\left(X_t\right)$	$0.318^{***}$ (0.035)				0.388*** (0.054)			
$\log\left(X_t\right) \times 1 (i = \text{CPC})$		0.350*** (0.051)				0.466*** (0.080)		
$\log\left(X_t\right) \times 1 \left(i = LPC\right)$		0.215*** (0.065)				$0.166^{*}$ (0.100)		
$\log\left(X_t\right) \times 1 \ (i = \text{NDP})$		0.365*** (0.063)				$0.480^{***}$ (0.098)		
$\log\left(X_t\right) \times 1 \ (t \le 2015)$			0.359*** (0.040)				$0.484^{***}$ (0.064)	
$\log\left(X_t\right) \times 1 \ (t \ge 2015)$			0.250*** (0.065)				$0.226^{**}$ (0.101)	
$\log (X_t) \times 1 (i = \text{CPC}) \times 1 (t \le 2015)$				0.432*** (0.060)				0.597*** (0.098)
$\log (X_t) \times 1 (i = \text{LPC}) \times 1 (t \le 2015)$				0.274*** (0.078)				0.305** (0.123)
$\log (X_t) \times 1 (i = \text{NDP}) \times 1 (t \le 2015)$				0.371*** (0.073)				$0.530^{***}$ (0.117)
$\log (X_t) \times 1 (i = \text{CPC}) \times 1 (t \ge 2015)$				0.120 (0.089)				0.057 (0.131)
$\log (X_t) \times 1 (i = \text{LPC}) \times 1 (t \ge 2015)$				0.205* (0.106)				0.006 (0.153)
$\log (X_t) \times 1 (i = \text{NDP}) \times 1 (t \ge 2015)$				0.337** (0.125)				$0.404^{**}$ (0.200)
Note:				-		$^*p < 0.1; ^{**}p$	<i>γ</i> < 0.05; ***	p < 0.01

Table 1.1: Estimates of Issue Responsiveness

public salience of this issue. This estimate is statistically significant at the 99% confidence level.

Secondly, 2SLS estimation noticeably alters the coefficient values and reveals significant heterogeneity in issue responsiveness among the three parties. Surprisingly, the Liberal Party exhibits a lower responsiveness to changes in the public salience of climate change compared to the Conservative Party and the New Democratic Party. However, this does not imply that the Liberals engage in fewer discussions about climate change overall. In fact, it appears that they address the issue on their own terms and successfully increase its public salience. This can be observed by comparing columns (2) and (6): instrumental variables estimation reduces the estimate of the Liberals' issue responsiveness by approximately 25%. This finding aligns with the notion that the Liberals have effectively bolstered the public salience of climate change during the period of study. Initially, this may create the illusion of issue responsiveness, which our identification strategy disentangles by separating the effect of public salience on Question Period interventions from the effect of interventions on public salience. This "reverse effect" primarily occurs during the tenure of the Liberal Party in government. Specifically, 2SLS estimation reduces the estimate of the Liberals' issue responsiveness during this period by around 99%, while increasing it by approximately 29% for the period prior to 2015.

Thirdly, both the Conservative Party and the New Democratic Party exhibit a similar level of issue responsiveness. This finding is notable considering that climate change has historically been a weaker policy issue for the Conservatives. The fact that the Conservatives' response to changes in the public's perception of the salience of climate change is not significantly different from that of the New Democrats adds credibility to the notion that the Question Period compels the governing party to address challenging or unfavorable policy issues. This interpretation is further supported by the observation, as hinted in Figure 1.3, that the estimated level of issue responsiveness for the Conservative Party is approximately 77% lower after 2015 compared to when they held government. After 2015, the issue responsiveness of the Conservatives is statistically indistinguishable from zero. This difference is statistically significant at a confidence level of 95%. In contrast, there is no statistically significant difference in the issue responsiveness of the New Democrats before and after the 2015 election.

		OLS			2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)
$\overline{\log\left(X_t ight)}$	0.432*** (0.060)	0.222*** (0.041)	0.220*** (0.042)	0.597*** (0.098)	0.348*** (0.068)	0.361*** (0.075)
$\tilde{Y}_{\text{LPC},t}$		0.330*** (0.036)			0.298*** (0.038)	
$\tilde{Y}_{\text{NDP},t}$		0.356*** (0.039)			0.308*** (0.043)	
$\tilde{Y}_{\text{LPC},t} \times 1  (t \le 2011)$			0.503*** (0.047)			0.468*** (0.048)
$\tilde{Y}_{\text{NDP},t} \times 1 \left( t \le 2011 \right)$			0.285*** (0.044)			0.255*** (0.046)
$\tilde{Y}_{\text{LPC},t} \times 1 \ (t \ge 2011)$			0.123** (0.052)			0.101* (0.053)
$\tilde{Y}_{\text{NDP},t} \times 1 \ (t \ge 2011)$			0.483*** (0.072)			0.443*** (0.074)

Table 1.2: Estimates of the Government's Issue Responsiveness—Conservative Party of Canada

Note:

 $p^* < 0.1; p^* < 0.05; p^* < 0.01$ 

	OLS		2SLS	
	(1)	(2)	(3)	(4)
$\log\left(X_t\right)$	0.205* (0.106)	0.134 (0.101)	0.006 (0.153)	-0.122 (0.153)
$\tilde{Y}_{\text{CPC},t}$		0.286*** (0.098)		0.309*** (0.098)
$\tilde{Y}_{\text{NDP},t}$		0.135** (0.058)		0.166** (0.066)

Table 1.3: Estimates of the Government's Issue Responsiveness—Liberal Party of Canada

#### **Estimates of the Government's Issue Responsiveness**

One could argue that assessing the issue responsiveness of the government in the context of Question Period is futile. After all, the primary role of the government during the Question Period is to provide responses to the questions raised by the opposition. It is reasonable to expect that the government will address at least some of the inquiries from the opposition parties. By transitivity, if the opposition parties are responsive to the public salience of climate change when formulating their questions, and the government offers forthcoming answers, the government should also be responsive to the public salience of climate change. In this sense, a portion of the government's issue responsiveness is expected to be mediated by the opposition's inquiries. However, it is crucial to acknowledge that the government has considerable flexibility in how it chooses to respond to questions. A minister may downplay the relevance of the issue raised by their opposition counterpart and instead choose to focus on a more favorable topic. Hence, it is unlikely that the entirety of the government's issue responsiveness will be solely dictated by the opposition's inquiries.

We examine the extent to which the government's issue responsiveness is mediated by the questions posed by the opposition. To accomplish this, we employ a regression model akin to Equation (1.1), incorporating the proportion of climate change-related interventions made by each opposition party during the Question Period as covariates. This regression model is defined as follows:

$$\tilde{Y}_{it} = \alpha_i + \beta_i \log \left( X_t \right) + \sum_{j \neq i} \lambda_{ij} \tilde{Y}_{jt} + \varepsilon_{it}.$$
(1.2)

Here, the coefficient  $\beta_i$  represents the proportion of party *i*'s issue responsiveness during its time in government that is not influenced by the inquiries made by opposition parties.

The estimation results for the Conservative Party are presented in Table 1.2. Columns (1) to (3) display the OLS estimates, while columns (4) to (6) show the 2SLS estimates. For reference, columns (1) and (4) present the estimates of the Conservative Party's issue responsiveness during its time in government without considering the influence of Question Period interventions from opposition parties. Columns (2) and (5) provide estimates of the Conservative Party's issue responsiveness, taking into account the impact of inquiries from opposition parties during its tenure in government. In columns (3) and (6), the responsiveness to questions from opposition parties is analyzed separately before and after the 2011 election. It is important to

note that in May 2011, the Liberal Party and the New Democratic Party underwent a change in status, with the latter becoming the official opposition and the former falling to third-party status. Therefore, the results in columns (3) and (6) allow us to assess whether this change led to a structural shift in the Conservative Party's responsiveness to inquiries from opposition parties.

The estimation results for the Liberal Party are presented in Table 1.3. Columns (1) and (2) display the OLS estimates, while columns (3) and (4) show the 2SLS estimates. For reference, columns (1) and (3) provide the estimates of the Liberal Party's issue responsiveness during its tenure in government without considering the influence of inquiries from opposition parties. Columns (2) and (4) present the estimates of the Liberal Party's issue responsiveness and its responsiveness to inquiries from opposition parties during its time in government.

The findings presented in Tables 1.2 and 1.3 indicate that, when in government, parties generally respond to inquiries from opposition parties. Specifically, the proportion of Question Period interventions dedicated to climate change by the government increases significantly when the opposition parties focus a larger share of their questions on this policy issue. Furthermore, it appears that the government is more responsive to inquiries from the official opposition compared to those from third parties. This observation is supported by examining Column (6) in Table 1.2 and Column (4) in Table 1.3. From 2006 to 2011, the Conservative government demonstrated significantly greater responsiveness to the Liberal Party compared to the New Democratic Party. From 2011 to 2015, the government displayed significantly greater responsiveness to the New Democratic Party than the Liberal Party. Lastly, from 2015 onwards, the government exhibited more responsiveness to the Conservative Party than the New Democratic Party. Overall, these results suggest that the Question Period serves as an effective mechanism for opposition parties, particularly the official opposition, to elicit responses from the government on current affairs.

Not all of the government's issue responsiveness can be attributed solely to the inquiries made by the opposition parties. Accounting for the topic composition of the Question Period interventions from the opposition parties does not alter the finding that the party in government demonstrates a significant level of responsiveness to the public salience of climate change. Although the magnitude of this responsiveness decreases by approximately 40%, there remains a statistically significant relationship between the share of Question Period interventions from the Conservative Party

addressing climate change and the public salience of this issue, even after considering the content of the questions posed by the opposition parties. This suggests that, apart from the influence of the inquiries from opposition parties, the Conservative Party had direct incentives to be responsive to the public salience of climate change while in government. However, these incentives did not persist beyond the 2015 election. Regardless of whether we account for the topic composition of the inquiries from the opposition parties, there is no statistically significant relationship between the share of Question Period interventions from the Liberal Party devoted to climate change and this issue's public salience.

#### 1.7 Discussion and Conclusion

This article makes valuable contributions to the study of political representation and issue responsiveness in Canadian politics.

All three parties studied show some level of responsiveness to the public salience of climate change during the Question Period. However, the New Democratic Party consistently exhibits the highest degree of responsiveness to fluctuations in the public's interest in climate change. This observation aligns with the party's status as the smallest of Canada's three major national political parties and its limited experience in federal government, except for a period in the official opposition from May 2011 to October 2015. It is possible that smaller parties face greater difficulties in influencing or diverting the public agenda, which makes them more directly responsive to the public's concern about climate change. Nonetheless, it is important to recognize that the New Democratic Party's level of responsiveness depends on its favorable reputation on the issue of climate change, as it benefits the party to actively engage in discussions on this topic.

During their tenure in government, the Conservative Party displayed a level of issue responsiveness similar to that of the New Democratic Party, despite the Conservatives generally being perceived as having a weaker stance on climate change. However, after the Conservatives transitioned to the opposition, they did not exhibit notable responsiveness to the public salience of climate change. This finding highlights the significant role played by the Question Period in ensuring democratic accountability. By granting opposition parties the opportunity to shape the agenda, the Question Period empowers them to pressure the government into addressing issues that hold importance to the public but might otherwise be ignored or neglected. Our findings suggest that the government is more responsive to inquiries from the official opposition compared to those from smaller parties. Nonetheless, it is important to acknowledge that the government's issue responsiveness is not solely influenced by inquiries from the opposition. Taking into account inquiries from opposition parties does not alter the assessment of whether the government demonstrates significant responsiveness to the public salience of climate change.

Our findings reveal that, during its tenure in government, the Liberal Party successfully elevated the public salience of climate change. Following the 2015 election, it appears that the Liberals have not been responsive to the public salience of climate change but have instead addressed this policy issue on their own terms. This has had a noticeable impact on the public salience of climate change. While this may initially create the illusion of issue responsiveness, our research design allows us to disentangle genuine issue responsiveness from the effect of Question Period interventions on the public salience of climate change. Consequently, we observe that the Liberals' responsiveness to public salience was effectively null during their time in government. This outcome underscores the significant role played by political parties in shaping the political agenda and drawing attention to emerging policy concerns, such as the climate crisis. In this regard, we speculate that the government has greater influence over the public agenda compared to opposition parties.

The Supplementary Material presents the results of two robustness checks conducted in this study. Firstly, a placebo test was performed to estimate the effect of the public salience of climate change on the topic composition of Question Period interventions across all other topics. The analysis does not indicate any consistent effect of the public salience of climate change on the topic composition of Question Period interventions related to other topics. However, the findings do suggest that both the Conservatives and the Liberals engaged in some limited obfuscation and manipulation. Secondly, we examined the potential geographical variations in issue responsiveness. We acknowledge that our national measure of public concern may mask regional differences in the importance of climate change. Some scholars have suggested that political representation in the Question Period is "particularized," meaning that parties may represent the interests of certain constituencies and provinces more effectively than others (Penner et al., 2006). However, our analysis reveals little to no evidence indicating that parties respond differently to the public salience of climate change across individual provinces.

We acknowledge potential concerns regarding the external validity of our analysis, particularly in extending our findings to other policy issues and institutional con-

texts. Climate change in Canada possesses unique characteristics that may limit the generalizability of our insights. Its high salience leads to a significant number of Question Period interventions, and the issue's political contentiousness contributes to partisan variations in issue responsiveness. While these characteristics make climate change an intriguing subject to study in the Canadian context, it is plausible that other salient and politically contentious issues exhibit similar patterns of issue responsiveness. Several other institutions, such as the ten Canadian provincial legislatures, the British House of Commons, and the French National Assembly, have procedures similar to the Question Period. Therefore, the insights gained from our analysis might potentially be applicable to these institutional contexts as well. However, it is important to consider whether there are specific idiosyncrasies associated with climate change in the Canadian context. For example, Canada's significant role as a producer of fossil fuels may influence the perception of climate change among political elites and the public. In summary, although it may be tempting to make generalizations to other policy issues and institutional contexts, it is vital to approach each situation with caution, taking into account its unique characteristics and potential peculiarities.

In conclusion, we believe that further research is crucial to gain a comprehensive understanding of how the exchanges between political parties during the Question Period are effectively communicated to the public and how this process may affect parties' issue responsiveness. The role of the media in disseminating political news is undeniably significant. In addition, it is important to recognize that the media also wields its own influence over the "public agenda." Previous studies, including those by Soroka (2000, 2002), have already explored the intricate interactions between the media, the public, and politicians in shaping the public agenda. Nevertheless, to fully grasp issue responsiveness, it is imperative that we delve deeper into the mechanisms through which information flows from politicians to the public. Therefore, a more thorough investigation of this topic is warranted.

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# Chapter 2

# MEASURING THE QUALITY OF ANSWERS IN POLITICAL Q&AS WITH LARGE LANGUAGE MODELS

Alvarez, R. M., & Morrier, J. (2025). Measuring the Quality of Answers in Political Q&As with Large Language Models. https://doi.org/10.48550/arXiv.2404. 08816

#### 2.1 Introduction

Bull (1994, p. 115) asserts that "in any democratic system, questions play an important role in political communication." This is evident from the prevalence of question-and-answer (Q&A) sessions in political settings, including election debates, press conferences, and town hall meetings. Formal institutional practices, such as congressional hearings and parliamentary questions, also provide venues for such dialogues. These are generally considered vital for the effective accountability of the executive branch.

The primary objective of Q&As is to elicit informative answers from those questioned, though participants may have other motives. The latter may undermine the quality of replies, such as when political messaging takes precedence over substantive dialogues. In this context, assessing the quality of answers is imperative, as it reflects the efficacy of the political institutions espousing the Q&A format.

However, measuring the quality of answers in political Q&As is hard. A key difficulty lies in defining and operationalizing answer quality, a complex and multi-faceted concept. For example, Bull and Mayer (1993) identified 30 tactics to elude questions in political interviews. Moreover, manually labeling large datasets with thousands of exchanges or more is prohibitively expensive and susceptible to human error, which poses challenges to human labeling and estimation through supervised learning.

In light of these challenges, we propose a novel approach for measuring the quality of answers in political Q&As. We assess the quality of an answer based on how easily and accurately it can be recognized among a set of candidate answers based on the text of the question. This measure reflects the reply's relevance and depth of engagement with the question. We estimate it in a self-supervised way by training a

language model on the corpus of observed questions and answers without additional human-labeled data. This is made possible by the strong parallel between our operationalization of answer quality and semantic search, a core task in natural language processing (NLP) that consists of retrieving from a database the information most relevant to a query (Bast et al., 2016). Rather than using these question-answering systems to identify the most pertinent answer from a set of candidates, we propose repurposing them to assess the quality of observed answers.

We showcase our methodology using the Question Period (QP) in the Canadian House of Commons as a case study. The House of Commons is the Parliament of Canada's lower chamber, where the Prime Minister and federal Cabinet ministers sit. QP takes place for 45 minutes every day the House is in session, drawing considerable attention from the media and public. During QP, members of Parliament (MPs), primarily those from opposition parties, can seek information from the government. It is one of the rare moments in Parliament when the opposition sets the agenda.

We analyze the 58,343 exchanges that occurred during QP from 2006 to 2021. Our analysis reveals that while some answers are only loosely related to questions, suggesting some evasion or obfuscation, most are at least moderately relevant, surpassing what we expect from random replies. Upon measuring answer quality, we investigate its correlates, focusing on its relationship with power dynamics in the House of Commons. We observe a significant correlation between the quality of answers and the party affiliation of the MP asking questions, with questions from government backbenchers, MPs from third parties (as opposed to the official opposition), and those from parties ideologically closer to the government tending to receive more relevant answers.

Our work engages with a theoretical debate on the nature of QP, reflecting the tension between the deliberative and strategic approaches in comparative theories of parliamentary debates (Bächtiger, 2014; Whyte, 2018). While QP's official purpose is to allow MPs to seek the information necessary for effectively fulfilling their oversight responsibilities, some argue that it tends to devolve into a performative exercise, during which questions and answers are used for political messaging rather than for holding the government accountable. Our study assesses the extent to which and under what circumstances QP fulfills its intended function of enabling effective government oversight.

This paper is structured as follows. First, we situate our research within the existing literature. Next, we describe the origins and functions of QP. Building on this,

we operationalize answer quality and outline the data and methodology used to implement our proposed methodology. Then, we formulate and test hypotheses regarding the relationship between our measure of answer quality and relevant variables. Lastly, we discuss our methodology's broader applicability.

## 2.2 Related Literature

This paper is related to three bodies of academic literature, one substantive and two methodological.

Substantively, this study contributes to the literature on parliamentary questions, particularly QP. We build on recent research investigating the use of avoidance tactics by government ministers (Bull & Strawson, 2019; Kukec, 2022; Rasiah, 2010) and evasion tactics in political interviews (Bull, 1994, 1998, 2000, 2004; Bull & Mayer, 1993; Bull & Strawson, 2019; Waddle & Bull, 2020). We extend this line of inquiry to the Canadian context, where the quality of answers in QP has received limited attention, except for Whyte (2018)'s work. Unlike previous studies that relied primarily on human annotation and basic NLP, we employ advanced computational methods.

Methodologically, we contribute to the literature integrating tools from NLP into political science by harnessing semantic search to address substantive questions. Our model builds on sentence embeddings from a variant of Bidirectional Encoder Representations from Transformers (BERT), known as "Sentence-BERT" (Reimers & Gurevych, 2019). Political methodologists have widely adopted BERT and its variants (e.g., Bestvater & Monroe, 2023; Laurer et al., 2024; Wang, 2023; Widmann & Wich, 2023). Unlike standard word embeddings, which provide context-agnostic representations, Sentence-BERT embeddings capture the meaning of tokens within their specific context. They have consistently performed well in semantic search. Although generative models are beginning to outperform BERT in general-purpose text embedding tasks, BERT remains a cornerstone of NLP due to its reliability and ease of deployment.

Finally, this paper engages with the literature on predictive accuracy as a substantive measure of interest in political science, an idea originating from research on political polarization (Goet, 2019; Peterson & Spirling, 2018). We build on the concept of using predictive accuracy as a substantive metric by proposing to measure the relevance of answers by the accuracy with which they can be recognized given the question's text.

#### 2.3 Institutional Context

QP takes place for 45 minutes each day the House of Commons is in session (Bosc & Gagnon, 2017, ch. 11). Each question and answer is limited to 35 seconds, resulting in a rapid and lively exchange. This session begins with the Speaker inviting the Leader of the Opposition to ask a series of questions, typically directed at the Prime Minister. Subsequent questions follow a predetermined order reflecting the parties' representation in the House. Although government backbenchers and independent MPs occasionally participate, most questions come from members of officially recognized opposition parties. Party whips coordinate their caucus's participation and submit a suggested speaking order to the Speaker's office. The government chooses which minister or parliamentary secretary will respond to each question.

QP functions as both an accountability and oversight mechanism and a political communication platform. QP's official purpose is for MPs to seek information from the government, setting it apart from other parliamentary debates and any sequence of loosely related speeches. Its origins lie in the principle of responsible government (Bosc & Gagnon, 2017, ch. 2). Under this constitutional convention, the government must retain the confidence of a majority of its members to stay in power. Concretely, this means that some "confidence motions" must be adopted; otherwise, the government must resign or request the Parliament's dissolution. Regular opportunities for dialogue between the government and the opposition also contribute to upholding responsible government, providing MPs with the information necessary to exercise their prerogatives effectively. QP is arguably the most prominent of these mechanisms and one of the rare moments in Parliament when opposition parties set the agenda.

QP is also a political communication platform, allowing participants to reach a wider audience. Given the intense media and public attention it garners, QP offers politicians a valuable opportunity to boost their public profile, cast their opponents in a negative light, and rally public support. In practice, opposition MPs use QP not only to gather the data and information necessary for effective oversight but also to convey key messages and "score political points" by challenging the government, providing commentary, and proposing alternative policies, for example. Similarly, the government uses this time not only to respond to the opposition's questions but also to counter criticisms, defend its policies, and promote its achievements.

QP's role as a political communication platform is not inherently incompatible with its function as an accountability and oversight mechanism. For example, the fear of public embarrassment can drive government ministers to engage seriously with questions (Kernaghan, 1979). This is particularly consequential for a majority government since the opposition cannot threaten its survival. QP's public nature can also undermine its effectiveness as an accountability and oversight mechanism. For example, it might prompt the government to avoid providing direct answers when they may strengthen the opposition's position or reveal embarrassing truths. As opposition parties and the government focus on scoring political points, the quality of their dialogue may suffer, causing QP to become a mere performative exercise. Finally, government backbenchers often ask questions not to gather information but to cast a favorable light on the government's achievements.

In sum, QP is both an accountability and oversight mechanism and a political communication platform. These roles interact in complex ways, complicating any effort to conceptualize the quality of answers in QP. Ministers are unlikely to provide unadorned answers, frequently using them to convey political messages, while opposition MPs may ask questions for purposes other than seeking information. Yet, we must be able to look past these political tactics to assess whether answers are meaningful and contribute to holding the government accountable, as this is an explicit desideratum of responsible government.

# 2.4 Operationalizing Answer Quality

As described above, the formal purpose of QP is to enable MPs to seek information from the government. We wish to assess whether and to what extent answers fulfill this function. To this end, answers must be directly relevant to the questions and engage substantially with the issues raised (Maricut-Akbik, 2021). Accordingly, we propose measuring the quality of answers based on the depth of their engagement with and their relevance to questions. Under this framework, more relevant answers reflect a more effective QP.

Drawing a parallel with semantic search, we gauge an answer's relevance based on how easily and accurately it can be recognized from a set of candidates randomly drawn from the corpus of observed answers based on the question's text. This approach builds on the premise that relevant answers are more easily linked to questions than irrelevant ones, as they are uniquely tailored to questions, making them stand out as the most likely choice. In contrast, less relevant answers are more difficult to connect, with the least pertinent being so vague or generic that they could apply to many questions, making other answers appear just as, if not more, probable. A strong connection exists between our measure of answer quality and semantic similarity, a core concept in NLP based on the "distributional hypothesis," which asserts that words and sentences occurring in similar contexts tend to have similar meanings (Jurafsky & Martin, 2024, p. 101). Under this hypothesis, the relevance of a word or sentence to a given context can be measured by its likelihood of occurring in it. These similarity relationships are typically learned through "fill in the blank" tasks, in which models predict the word or sentence appearing in a given context.

This approach addresses challenges inherent in operationalizing answer quality. For instance, we adopt a pragmatic perspective on relevance, focusing on the functional relationship between questions and answers rather than on a fixed and necessarily incomplete list of characteristics. We can computationally implement our conception of answer quality without human-labeled data, fostering efficiency. Lastly, following Bull (1994), we conceptualize answers as existing on a continuum.

Admittedly, our criterion considers a single dimension of answer quality. It alone does not guarantee a satisfactory answer. For example, a reply that rephrases the question without adding new information may satisfy it. However, we can confidently classify any response that fails to meet this minimal standard as low quality. In this case, speakers effectively talk past each other. Accordingly, our approach allows us to detect deliberate efforts to deflect attention and obscure the essence of the discussion.<sup>1</sup> Overall, while this criterion is a necessary condition for high-quality answers, it is not sufficient and, consequently, may overestimate answer quality. A more comprehensive assessment of answer quality might also consider factual accuracy, civility, clarity, conciseness, and comprehensiveness.

Also, confounding variables, such as the nature of the questions, can affect our assessment of answer quality. All else equal, an easily distinguishable answer is more relevant than one that is difficult to link to the question. However, not all questions are equally straightforward to answer and engage with. For instance, a lengthy preamble covering multiple topics precedes many poorly framed questions (Martin, 2011). These questions offer multiple rebuttal angles and make it harder for responders to engage comprehensively with the question. In this context, our criterion requires a high-quality answer to address as many of the topics raised in the preamble as possible, which is a reasonable expectation.

<sup>&</sup>lt;sup>1</sup>Effective diversions are characterized by the absence of semantic ties to the question, ensuring that the answer does not unintentionally reinforce the topic it means to avoid. Like the phrase "Don't think of an elephant!" inevitably triggers the thought of an elephant, a reply with even a slight semantic tie to the question is likely to fail as a genuine diversion (Lakoff, 2014).

Nevertheless, the relationship between the nature of the questions and our measure of answer quality is only indirect. Therefore, we cannot regard the latter as equally reflecting any notion of question quality. While some questions are inherently more challenging, well-crafted questions do not guarantee high-quality answers. More fundamentally, the quality of questions should not be judged solely by the answers they elicit. No standard for assessing question quality parallels ours, based on desirable traits consistent with the QP's stated purpose. Ultimately, this hypothetical relationship between the nature of questions and our measure of answer quality does not prevent meaningful comparisons of answer quality across variables, provided that the nature of questions is consistent.

In conclusion, we reiterate that eliciting and supplying insightful answers is only one of the many goals pursued by QP participants. Tensions can arise between these objectives, potentially undermining the relevance of answers. In this context, the incentives of both the government and opposition parties shape the quality of answers. Nonetheless, it remains an essential feature to consider, as it reflects the quality of the dialogue and QP's efficacy as a mechanism for accountability and oversight.

#### 2.5 Methodology

# **Network Architecture**

We implement our approach for measuring answer quality in a self-supervised manner. In particular, we train an artificial neural network to identify which answer from a random set of candidates corresponds to each question based on their respective texts. This model is trained on the corpus of observed questions and answers without additional human-labeled data. It belongs to the general class of semantic search models, which analyze the meaning of a query and seek to return the most relevant value from a database.

The network has three primary layers: (i) an input layer that receives a questionanswer pair, (ii) two identical encoders that independently process each input to produce dense numerical representations called embeddings, and (iii) the computation of a similarity metric between the embeddings. This architecture, known as a biencoder, is represented in Figure 2.1.

Question and answer embeddings are generated with Sentence-BERT encoders (Devlin et al., 2019; Reimers & Gurevych, 2019). Their architecture is illustrated in Figure 2.2, with the branch for Token 1 highlighted and the others faded. An encoder



Figure 2.1: Biencoder Architecture



Figure 2.2: Sentence-BERT Encoder Architecture

takes sentences or short paragraphs, represented as ordered sequences of tokens corresponding to words or word segments, as input. It maps each token to its value's embedding and concatenates it to positional embeddings that encode its relative location in the sequence. These embeddings go through many successive layers consisting of a multi-head self-attention mechanism and a feed-forward component. A self-attention head considers the current token's embedding and those of the surrounding tokens and outputs a weighted sum of these embeddings based on learnable weights. Within each layer, multiple heads operate in parallel. This mechanism's output is combined with the original token embedding and passed through a fully connected layer. Ultimately, the encoder outputs a numerical vector for each input token, which we average to get sentence embeddings.

We use the cosine similarity to measure the resemblance between question and answer embeddings. Upon training the model, it becomes our measure of the quality of an answer relative to the question. For reference, the cosine similarity is a measure of the angle between two numerical vectors x and  $y \in \mathbb{R}^n$ :

$$\cos\left(x,y\right) = \frac{x \cdot y}{\|x\| \, \|y\|}$$

By construction, the value of the cosine similarity is between -1 and 1, with two parallel vectors having a cosine similarity of 1, two orthogonal vectors a cosine similarity of 0, and two opposing vectors a cosine similarity of -1.

# **Training Objective**

We adopt the Multiple Negatives Ranking Loss as our training objective (Henderson et al., 2017). Given a batch of size K, questions are represented by the embeddings  $X = (x_1, ..., x_K)$  and the corresponding answers by the embeddings  $Y = (y_1, ..., y_K)$ . The objective is to minimize the mean negative log probability of observing the correct answer from all candidate answers in the batch. This is mathematically equivalent to maximizing the likelihood of observing the correct answer but improves numerical stability during optimization.

We model the probability of observing an answer as a logistic regression, where the input features are the cosine similarities between the question's embedding and those of the candidate answers. In particular, the probability of observing the correct answer equals:

$$P(\mathbf{y}_i \mid \mathbf{x}_i) = \frac{\exp\left(\alpha \cos\left(\mathbf{x}_i, \mathbf{y}_i; \boldsymbol{\theta}\right)\right)}{\sum_{j=1}^{K} \exp\left(\alpha \cos\left(\mathbf{x}_i, \mathbf{y}_j; \boldsymbol{\theta}\right)\right)},$$

where  $\alpha$  is a fixed scaling parameter and  $\theta$  are the Sentence-BERT encoder's parameters.

Overall, our training objective is to find the parameters  $\theta$  that minimize the following loss function:

$$\mathcal{J} (\boldsymbol{X}, \boldsymbol{Y}; \boldsymbol{\theta}) = -\frac{1}{K} \sum_{i=1}^{K} \log \left( P \left( \boldsymbol{y}_{i} \mid \boldsymbol{x}_{i} \right) \right)$$
$$= -\frac{1}{K} \sum_{i=1}^{K} \log \left( \frac{\exp \left( \alpha \cos \left( \boldsymbol{x}_{i}, \boldsymbol{y}_{i}; \boldsymbol{\theta} \right) \right)}{\sum_{j=1}^{K} \exp \left( \alpha \cos \left( \boldsymbol{x}_{i}, \boldsymbol{y}_{j}; \boldsymbol{\theta} \right) \right)} \right)$$
$$= -\frac{1}{K} \sum_{i=1}^{K} \left[ \alpha \cos \left( \boldsymbol{x}_{i}, \boldsymbol{y}_{i}; \boldsymbol{\theta} \right) - \log \left( \sum_{j=1}^{K} \exp \left( \alpha \cos \left( \boldsymbol{x}_{i}, \boldsymbol{y}_{j}; \boldsymbol{\theta} \right) \right) \right) \right].$$

This loss function pushes the model to assign a higher cosine similarity with the question to the correct answer and a lower similarity to incorrect answers.

Our training objective treats questions and answers asymmetrically, using questions as anchors. We could use answers as anchors instead, training the model to recognize the question that each answer addresses. This approach differs from traditional semantic search, where answers seldom need to be linked to questions, and generates estimates of how deeply each answer engages with the question enough that we can identify the latter from the former. Still, this approach produces cosine similarity estimates similar to ours, with a 0.959 correlation coefficient (see Online Supplementary Material).

# **Transfer Learning**

Consistent with best practices in NLP, we train our model with transfer learning (Laurer et al., 2024; Ruder et al., 2019). Rather than starting the training process from scratch, we begin with estimates from a model trained for general tasks on a large corpus different from ours that we subsequently "fine-tune" to our specific needs. Specifically, we use the multi-qa-mpnet-base-cos-v1 model from the sentence-transformers library, trained for two tasks: (i) prediction of randomly masked words in short sentences and paragraphs from a large corpus of general text, and (ii) semantic search on a dataset of 215 million question-answer pairs from various online forums. Among the question-answering models available in the sentence-transformers library, this model achieves the highest performance in semantic search over six benchmark datasets. We fine-tune the model on five percent

of the exchanges in our corpus, reserving one percent as a validation set to optimize training hyperparameters. We use the remaining 94% for inference.

Fine-tuning consists of further updating the pre-trained model's parameters to improve its performance on our specific corpus and task.<sup>2</sup> This is desirable because politicians are unlikely to answer questions in QP the same way users of online forums would. Nevertheless, the pre-trained model encodes general language patterns and a general understanding of semantic search and question answering. This foundational knowledge can accelerate the learning of domain-adapted embeddings at minimum cost, with studies showing that fully custom models typically offer no systematic improvements over fine-tuned models (e.g., Arslan et al., 2021). Fine-tuning is also advantageous as we reserve most of our corpus for inference, leaving us with insufficient data to train a model from scratch. Finally, using a pre-trained model is an implicit form of regularization, reducing overfitting and improving generalizability.

Alternatively, we could use embeddings from the pre-trained model without any fine-tuning. This approach poses a risk: the model might ascribe a poor quality to some answers, not due to their inherent irrelevance but because it is unaccustomed to how politicians reply in political Q&As. In contrast, our goal is to assess how effectively a model familiar with the context can accurately match questions to their answers.

Admittedly, fine-tuning comes with some risks, too. One concern is that it may allow the model to learn evasion tactics and connect questions with their answers despite their poor quality. It would result in conservative estimates that artificially inflate answer quality. Indeed, if we ignored evasion tactics, answers previously deemed relevant may no longer be, while those initially considered irrelevant may become even more so. However, pure evasion will tend to result in replies unrelated to the original question. To draw an analogy, prisoners do not escape by remaining in their cell or even relocating to another but by leaving the prison grounds entirely, with their success depending on the guards losing track of their whereabouts. It raises doubts about the model's ability to effectively learn such behavior, especially given its exposure to a limited number of question-answer pairs during fine-tuning, with only a portion involving evasion. It also highlights the paradoxical nature of

<sup>&</sup>lt;sup>2</sup>The Online Supplementary Material contains details on the performance of the pre-trained and fine-tuned models over the inference set.

"predictable evasion," as an evasion strategy that we can easily associate with the question fails in its purpose.

To be sure, we compared the cosine similarity estimates between the pre-trained and fine-tuned models. We found a strong correlation between estimates from both models, with a 0.744 correlation coefficient.<sup>3</sup> On average, question-answer pairs with low cosine similarity estimates in the pre-trained model have even lower estimates in the fine-tuned model, and pairs with the highest cosine similarity have similar cosine similarity estimates in both models. This suggests that fine-tuning enhances the model's ability to distinguish between relevant and irrelevant pairs without causing a general rise in cosine similarity estimates. Furthermore, substantive results from the pre-trained model provided in the Online Supplementary Material are consistent with those from the fine-tuned model.

#### **Mean Reciprocal Rank**

We optimize the model's training hyperparameters based on its performance on the validation set as measured by the mean reciprocal rank (MRR), a standard metric for evaluating the accuracy of information retrieval systems (Jurafsky & Martin, 2024, p. 311). We compute the MRR by averaging across all questions in the validation set the reciprocal of the rank of the correct answer among all candidate answers in the validation set, ordered by decreasing similarity to the query:

$$MRR = \frac{1}{|Q|} \sum_{i=1}^{|Q|} \frac{1}{Rank_i}.$$

It is standard to set all ranks below a certain threshold to zero. Accordingly, we truncate all ranks below ten. The Online Supplementary Material contains MRR values for various training hyperparameter values and lists the training hyperparameters we retained.

The MRR accounts for the fact that our model ranks potential answers based on their likelihood of being correct. It aligns with our objective that correct answers attain the highest possible rank among candidate answers. In contrast, classification metrics like precision and recall aggregate all answers above a certain rank or threshold, such as all those above the tenth rank, treating cases in which the correct answer ranks first the same as those in which it ranks ninth.

# Table 2.1: Five Exchanges with the Lowest Cosine Similarity Between Questions and Answers

Question	Answer	Cosine Similarity
Mr. Speaker, the Prime Minister confirmed yesterday that Justice Grenier had the full cooperation of the federal government during his investigation. That is entirely untrue. The federal government sent a lawyer who added numerous interventions specifically to prevent careful examination of federal spending. Why did the government go to so much trouble to protect the Liberals, Conservatives and the NDP from the investigation? What are they all trying to hide?	Mr. Speaker, let us all take a look at what the new Government of Canada has achieved since coming to power. We recognized that Québeckers form a nation within a united Canada, we resolved the issue of Quebec's presence at UNESCO, we resolved the fiscal imbalance issue. This concrete and positive action demonstrates very clearly that, together, Québec and Canada are progressing just fine, thank you.	-0.1245
Mr. Speaker, the current Prime Minister participated in a demonstration in 2012, when he gave his word to Aveos workers. He said, and I quote, "It is such a shame that we have to demonstrate to ask the law and order government to obey the law." More recently, he said, "It is not true that our best resources are in the ground somewhere. Our best resources are human resources." Is that how a prime minister keeps his word?	Mr. Speaker, I reiterate that, of course, the Government of Canada is pleased by Air Canada's announcement of its intention to purchase the Bombardier CSeries aircraft. It is a major advancement in aviation. I am certain that this addition to the Air Canada fleet will be of major benefit, both to that company and to Canada's aerospace sector across the country.	-0.1310
Mr. Speaker, the Prime Minister went to China to launch free trade negotiations, but the Chinese regime had something else in mind, even though the Prime Minister did everything he could to appease China and speed up takeovers of Canadian companies by waiving security reviews. The Prime Minister clearly has zero credibility when it comes to China. How are Canadians supposed to trust this Prime Minister to act in their best interest?	Mr. Speaker, I am looking forward to answering my colleague's questions, but first I would like to congratulate the four new members who were elected last night and who will be joining us here. I also want to highlight the 24 people who stepped up across the country to put their names on ballots in the by-elections. All of us in this place know what it takes to put your name on a ballot. I congratulate all of them, and all of the volunteers who underpin the strength of our democracy. I again look forward to congratulating the four new members when they arrive in this House. This was a good day for Canada, and a good day for our democracy.	-0.1323
Mr. Speaker, if the finance minister were listening to Canadians, he would know that families are getting ripped off at the bank, ripped off at the gas pump, ripped off by cellphone companies and ripped off on their cable bills. But the rip-off does not end there. The finance minister is personally ripping off taxpayers. He paid a friend \$200,000 for a 20 page speech. Does he even know that \$200,000 is the average family's income for three years? This is unjustifiable. He has no moral authority to talk about budgetary matters or anything else. Why does he not just resign?	Mr. Speaker, the hon. member would know, if he bothered to review the material, that the work done was extensive. It was done by two people over an extensive period of several months. It related to policy and communications and not as the member just suggested. It is plain that the member has not bothered to review the documentation which is publicly disclosed.	-0.1485
Mr. Speaker, it seems that "plus ça change, plus c'est pareil." Over the past few months, MPs have spent hundreds of hours hearing witnesses and debating on how to fight climate change in Canada. However, it seems the Conservative government does not care if Bill C-30 is ever brought to the floor of the House. Mr. Speaker, I am asking you today to get a search warrant to see if we can find Bill C-30 and bring it back to the House because the government is not going to do it. I ask you, Mr. Speaker, if you can find it, get it back to the House so we can debate it, get it passed and fight climate change now.	Mr. Speaker, I did note the recommendation of the hon. member, that people call me on this issue. I am gathering from some recent press reports that they should be able to reach me without calling at all; I can just hear through mediums.	-0.1625

# Table 2.2: Five Exchanges with the Highest Cosine Similarity Between Questions and Answers

Question	Answer	Cosine Similarity
Mr. Speaker, due to the efforts of our government and based on our tremendous respect for their service to our country, Canada's injured veterans may receive an average monthly benefit of between \$4,000 to \$6,000. These are supports that our injured veterans need and deserve. Can the Parliamentary Secretary to the Minister of Veterans Affairs please update this House on the benefits that our government provides to injured veterans and their families?	Mr. Speaker, I thank my hon. colleague from Wild Rose for the question and his hard work on this file. Indeed, the average monthly financial benefit that an injured veteran may be eligible for is between \$4,000 to \$6,000 a month, and in some cases injured veterans are receiving a total income that exceeds \$10,000 a month. Our government is committed to ensuring that our injured veterans and their families have the support they need and deserve. Unfortunately, the members opposite have voted against virtually every single initiative that our government has brought forward to help Canada's veterans.	0.9542
Mr. Speaker, Canadians gave our government a strong mandate to end the wasteful and ineffective long gun registry. My constituents have told me repeatedly that they want to see an end to this measure, which needlessly and unfairly targets law-abiding hunters, farmers and sport shooters. We see the long gun registry as no less than an attack on our way of life. Could the Minister of Public Safety please update the House on what our government is doing to address this important issue?	Mr. Speaker, I thank the member for the work that he has done on this important file. On May 2, Canadians gave the government a strong mandate to end the wasteful and ineffective long gun registry once and for all, and that is exactly what we are doing. Canadians across the country have called for this measure. For example, Michelle Vardy of the Georgian Bay Women's Outdoors Workshops and the Ontario Federation of Anglers and Hunters stated: As a woman, the long gun registry does not make me feel any safer or more secure. It is wasteful, ineffective and reduces funding to do real things. The 2 billion dollars that have already been spent would have been better used on programs like healthcare—	0.9507
Mr. Speaker, the people of China and Burma are suffering terribly in the aftermath of two tragic natural disasters. Canada responded immediately with an initial \$2 million to help the people of Burma when the cyclone hit. The unparalleled devastation in Burma has brought donor countries together to aid the victims of this tragedy. Could the Minister of International Cooperation update the House on our government's commitment to the victims in Burma and China?.	Mr. Speaker, Canada is deeply saddened by the tragic loss of life and devastation resulting from the disasters in Burma and China. We share the concerns of all Canadians for the victims and their families. Today I am announcing that our government will match the contributions of Canadians to humanitarian organizations working in Burma and China. Let me assure all Canadians our government will do our share of the international effort and ensure that our help does get to the victims and their families.	0.9452
Mr. Speaker, Toronto police chief Mark Saunders revealed in December that 82% of handguns involved in crimes were smuggled from the U. S. The minister of public safety had previously stated half of crime guns come from domestic sources. The statistics from when the minister was the chief in Toronto and carried a gun show the same picture as today: A very small percentage of firearms are from legal sources, while many crime guns are prohibited and from the United States. Could the minister table the source of his information that has now been proven incorrect?	Mr. Speaker, unfortunately my friend has some of his facts wrong. When I was the chief of police in Toronto, we had a firearms verification unit that traced the source of all handguns. During my tenure as chief for 10 years there, 70% of the crime guns that we seized, handguns, were smuggled from the United States. The other 30% were stolen or illegally diverted. The 50% number actually came from Chief Saunders in his first public statement, but he has since, as a result of some investigations they have done into smuggling, come out with another number. I acknowledge the facts there, but the reality is guns—	0.9382
Mr. Speaker, Canada is an attractive place for African countries that are drawn by its bilingualism, its economic opportunities and its many top-notch institutions of higher learning. Last week the Prime Minister and many of his ministers were in Africa to develop new business opportunities. Could the Prime Minister please update the House on the actions our government is taking to expand trade between Ethiopia and Canada?	Mr. Speaker, I thank the member for Longueuil—Charles-LeMoyne for her question and her hard work. Expanding and diversifying trade between Canada and fast-growing African economies is a priority for our government. Trade between Canada and Ethiopia totaled \$170 million in 2018. We announced that we will be entering into negotiations towards a foreign investment promotion and protection agreement with Ethiopia, which will help further increase trade and investments for businesses in both countries.	0.9374



Figure 2.3: Distribution of the Cosine Similarity Between Questions and Answers

# 2.6 Data

We analyze all exchanges that took place during QP from the 39<sup>th</sup> to the 43<sup>rd</sup> legislatures, a period spanning the fifteen years between the January 23, 2006 election and the September 20, 2021 election. This amounts to 58,343 exchanges, each consisting of a question and an answer. Our analysis focuses on questions from members of the four parties that have held official status at some point during our period of interest: the Bloc Québécois (BQ), the Conservative Party (CPC), the Liberal Party (LPC), and the New Democratic Party (NDP).<sup>4</sup> We construct our dataset from the official English transcripts published on the House of Commons website, which include professional translations of the interventions pronounced in French.

Figure 2.3 depicts the distribution of cosine similarity for all question-answer pairs in the inference set and a null distribution of the cosine similarity between randomly matched questions and answers. The observed distribution is approximately Gaussian with a notable negative skew, reflecting a larger share of answers having a relatively low level of relevance to questions compared to the share of answers with an equally high degree of pertinence. The answers with the lowest degree of

<sup>&</sup>lt;sup>3</sup>A scatterplot illustrating this correlation is enclosed in the Online Supplementary Material.

<sup>&</sup>lt;sup>4</sup>A party must have a minimum of twelve MPs to attain official status.



(a) Probability That the Correct Answer is Closest to the Question by Cosine Similarity Between Questions and Answers





(b) Probability That the Correct Question is Closest to the Answer by Cosine Similarity Between Questions and Answers



(c) Rank of the Correct Answer by Cosine Similarity Between Questions and Answers

(d) Rank of the Correct Question by Cosine Similarity Between Questions and Answers

Figure 2.4: Validity of the Cosine Similarity Between Questions and Answers

germaneness are orthogonal to the questions. The observed distribution of cosine similarity differs markedly from the null distribution, implying that the observed answers are significantly more relevant than random replies. While this is a low standard, it ensures that the answers have at least a superficial relevance to the questions.

Figure 2.4 shows that the cosine similarity between questions and answers reflects two factors: (i) the likelihood that the embeddings of a given question-answer pair are closest to each other, and (ii) the ranking of the correct question or answer among all candidates. Additional figures in the Online Supplementary Material confirm the consistency of the cosine similarity across legislatures and the party affiliation of the MPs asking questions. This dispels concerns that the correlation between answer quality and variables of interest revealed below is merely an artifact of variations in model accuracy across these features.

To illustrate what our measure of answer quality captures, Tables 2.1 and 2.2 present the five question-answer pairs with the lowest and highest cosine similarity, respectively. The exchanges with the lowest cosine similarity exemplify how a minister may fail to answer a question adequately. For example, the first two exchanges in Table 2.1 show ministers deflecting by underlining the government's achievements on tangentially related topics. The third exchange underscores that not all irrelevant answers arise from manifest ill intent. The fourth answer superficially touches on the question using generic talking points. In the fifth exchange, the minister dismisses the question with humor. Finally, only the second question suffers from poor framing, confirming that low-quality answers do not stem from poorly framed questions.

In contrast, the five exchanges in Table 2.2 feature detailed and precise answers. Many of the questions in these exchanges are emblematic of "planted questions." We expected these questions and answers to exhibit high similarity. However, it is unclear how these questions contribute to effective government accountability, underscoring the difficulty of operationalizing answer quality given QP's multiple functions. Nonetheless, the fourth exchange demonstrates that even a high-quality answer can challenge the question's premises, indicating that our measure of answer quality does not merely reflect collusion between the questioner and the respondent.

#### 2.7 Validity Experiment

To assess the validity of our measure of answer quality, we compare it to labels produced by manually labeling a random sample of 500 question-answer pairs from the inference set. The labeling process follows the methodology used by Bates et al. (2012) and Bull and Strawson (2019). In particular, we classify each answer into one of three categories:

- (i) *Full reply:* An answer that thoroughly provides the requested information and/or conveys explicitly the government's position on the issue.
- (ii) *Intermediate reply:* An answer that expresses the politician's views implicitly rather than explicitly and/or addresses only one part of a multi-pronged question.
- (iii) *Non-reply:* An answer that fails to address the question, instead diverting to an unrelated topic, omitting the requested information, and/or withholding the government's stance on the issue.



Figure 2.5: Average Cosine Similarity Between Questions and Answers and Count by Reply Category

In this validity experiment, our goal is not to show a perfect correlation between our measure and the benchmark labels, as they reflect different conceptions of answer quality. This would also imply that our methodology is redundant. Still, we expect our measure to align moderately with existing conceptions of answer quality, especially since the traits they encompass generally make it easier to recognize answers. Accordingly, we expect full replies to receive, on average, higher quality estimates than intermediate replies, which, in turn, should receive higher average estimates than non-replies. If this holds, it would confirm that our measure can be relied upon to capture meaningful variations in answer quality. This experiment also defines reference points for interpreting cosine similarity values, though we must use them cautiously to avoid misleading comparisons.

Figure 2.5 illustrates the results of this experiment, showing the average cosine similarity (on the left axis) and the observation count (on the right axis) for each reply category.<sup>5</sup> The differences in average cosine similarity across all categories are statistically significant at the 95% confidence level, implying that our measure of

<sup>&</sup>lt;sup>5</sup>A figure illustrating the distribution of cosine similarity estimates for each reply category is included in the Online Supplementary Material.

answer quality aligns with the previously defined taxonomy of replies while offering a complementary perspective.

The difference between the average cosine similarity for full replies (0.627) and nonreplies (0.433) is small relative to the range of cosine similarity estimates across all pairs. In addition, the average cosine similarity for intermediate replies (0.545) is nearly equal to that for the entire inference set (0.539), suggesting that the typical answer falls into this intermediate category. Notably, the average cosine similarity for non-replies is significantly above zero and nears the upper bound of the null distribution, indicating that non-replies are generally more relevant than random answers.

# 2.8 Hypotheses

We now turn to the relationship between the quality of answers and relevant variables. This analysis seeks to understand the behavior of QP participants and, specifically, identify factors associated with more relevant answers. It is also a test of our measurement approach's face validity: if none of the expected correlations materialize, it might suggest that our methodology does not effectively capture answer quality.

We focus our analysis on the relationship between the quality of answers and power dynamics in the House of Commons. We propose three hypotheses:

- (i) When the government has a minority of seats in the House of Commons, its answers tend to be more relevant.
- (ii) The relevance of answers varies with MPs' party affiliation, favoring government backbench members and those from parties with which the government is closer ideologically.
- (iii) The relevance of answers to questions from opposition parties varies with the size of their caucus.

The first hypothesis stems from the premise that a minority government has more incentives to collaborate with opposition parties since its survival hinges on their support in confidence votes. In this context, inadequate answers to the opposition's questions risk alienating them and jeopardizing the government's stability.

The second hypothesis suggests that the LPC, for example, may provide higherquality answers to questions from the NDP than those from the CPC. Additionally, government backbenchers asked 4,061 (7.4%) questions in the inference set. These questions are often "planted questions," that is, friendly, prearranged questions meant to highlight the government's achievements or criticize the opposition rather than scrutinize the government's actions. We expect a high similarity between these questions and their answers.

The third hypothesis considers how the size of an opposition party's caucus influences the quality of government answers. The direction of this relationship is initially ambiguous. On the one hand, a larger caucus could enhance the party's ability to secure high-quality answers by boosting its influence on confidence motions. On the other hand, a larger caucus may heighten competition with the government, prompting the opposition party to adopt a more aggressive questioning style and, in turn, cause the government to prioritize counterattacks over addressing the questions' substance, ultimately reducing the quality of answers.

Note that our analysis does not establish a causal relationship between answer quality and variables of interest. In particular, it is crucial to acknowledge the questions' endogeneity. In this context, the incentives of the government and opposition parties both influence answer quality. We must account for this when interpreting our findings.

### 2.9 Results

In this section, we describe the results of our analysis. Figure 2.6 illustrates the evolution of the average cosine similarity between questions and answers conditional on the party affiliation of the MP asking the question across the five legislatures within our period of interest. For context, the CPC held office between the 39<sup>th</sup> and 41<sup>st</sup> legislatures, whereas the LPC held office during the 42<sup>nd</sup> and 43<sup>rd</sup> legislatures. Also, minority governments held office during the 39<sup>th</sup>, 40<sup>th</sup>, and 43<sup>rd</sup> legislatures.

We draw four conclusions. First, answers to questions from government backbenchers have, on average, a much higher quality than those to questions from opposition members. The difference in the relevance of answers to questions from government backbenchers compared to opposition MPs is much greater than the difference in the relevance of answers to questions from members of various opposition parties. We expected this since members of the ruling party are unlikely to ask questions that would embarrass or hurt the government they belong to. As noted earlier, it is common for ministerial aides to arrange for government backbenchers



Figure 2.6: Average Cosine Similarity Between Questions and Answers by Party and Legislature

to ask friendly questions. Our finding gives credence to the belief that this is a common practice.

Second, there is mixed evidence regarding the hypothesized relationship between the quality of answers and whether the government holds a minority or majority of seats in the House of Commons. Comparing the 39<sup>th</sup> and 40<sup>th</sup> legislatures to the 41<sup>st</sup>, it seems that the CPC offered, on average, more relevant answers to questions from the opposition when it held a majority of seats in the House of Commons, contrary to our hypothesis. On the other hand, comparing the 42<sup>nd</sup> and 43<sup>rd</sup> legislatures, we find that the LPC offered, on average, more relevant answers to questions from the opposition when it held a minority of seats in the House. However, the 43<sup>rd</sup> legislature coincided with the COVID-19 pandemic, which likely affected the nature of the questions and the government's inclination to answer them transparently. Given this ambiguous evidence, we do not consider that the data confirms our hypothesis.

Third, third-party MPs receive, on average, more relevant answers than MPs from the official opposition. During the 39<sup>th</sup>, 40<sup>th</sup>, 42<sup>nd</sup>, and 43<sup>rd</sup> legislatures, the quality of answers to questions from members of third parties was significantly higher than

the quality of answers to questions from members of the official opposition. The outcomes from the 41<sup>st</sup> legislature, the first and only time the NDP formed the official opposition, further illustrate this. During that period, answers to members of the NDP were no different in quality from those given to members of the LPC. In contrast, there were statistically significant differences during the previous two legislatures. Figures in the Online Supplementary Material further support this finding, showing a statistically significant negative correlation between cosine similarity and the number and share of seats opposition parties hold. We attribute this difference to the fact that the media and public tend to see the official opposition as the "government-in-waiting," positioning it in direct competition with the government. It can lead the official opposition to be more antagonistic and assertive in questioning the government and the latter to be more hostile and reticent in answering its questions.

Fourth, the difference between answers to questions from the official opposition and third parties is smaller than the variations in responses to questions from different opposition parties attributable to their perceived ideological proximity to the government. For example, during the 42<sup>nd</sup> and 43<sup>rd</sup> legislatures, questions from NDP members have received much more relevant answers, on average, than those from all opposition parties before and in the same period. This relationship was particularly pronounced during the 43<sup>rd</sup> legislature when the LPC held a minority of seats in the House of Commons and heavily relied on the NDP to survive motions of confidence. Over that period, the representation of the NDP in the House of Commons was comparable to its representation during the 39<sup>th</sup> and 40<sup>th</sup> legislatures and the LPC's during the 41<sup>st</sup> legislature. Thus, we can impute this pattern to variations in the relative size of the NDP's caucus.

# 2.10 Conclusion

This paper proposes a novel approach for measuring answer quality, drawing inspiration from semantic search, a core task in NLP and information retrieval. Our methodology consists of assessing the quality of an answer by how easily and accurately it can be recognized from a random set of candidate answers given the question's text. This measure reflects the relevance of answers to questions. It is valuable for assessing the efficacy of QP as an accountability and oversight mechanism. A key advantage of our approach is that we can computationally implement it by fine-tuning a language model on the corpus of observed questions and answers without human-labeled data, making it highly efficient for analyzing large corpora. We showcased our methodology by studying QP in the Canadian House of Commons. Our findings imply that we should not consider QP as a time when government ministers innocently deliver plain answers to every question. Nor should we dismiss it as a stage for opposition MPs and government ministers to engage in political messaging and deliver essentially independent speeches disguised as questions and answers. Indeed, while our findings showed that some answers have a vague semantic connection to questions, suggesting some evasion or obfuscation, answers are generally moderately relevant to the questions asked, more so than if the government responded randomly. Therefore, in line with its stated purpose, QP effectively allows MPs to elicit relevant answers from the government.

Our measurement approach also allowed us to identify correlates of answer quality. Our analysis revealed a significant correlation between the quality of answers and the party affiliation of the MP asking questions, with questions from government backbenchers, MPs from third parties (as opposed to the official opposition), and those from parties ideologically closer to the government tending to receive more relevant answers. These findings underscore the substantive value of our measurement approach and provide strong evidence of its validity.

To complement our main study, the Online Supplementary Material contains an analysis of the correlation between the quality of answers and the topics of the questions, alongside two robustness checks. The first considers potential bias from sampling error in estimating latent representations. The second investigates the impact of including exchanges initiated by government backbenchers in the training set on our findings. The results from both robustness checks affirm our conclusions.

In conclusion, the measurement approach proposed in this article could apply to many other contexts within and beyond political science. Its applicability to institutions similar to QP, such as the United Kingdom's Prime Minister's Questions and France's *Questions au Gouvernment*, is evident. This methodology can also be used to analyze parliamentary hearings, election debates, and press conferences, including in the United States. Beyond political science, this approach could be valuable for analyzing news interviews with non-political public figures, press conferences by central bankers, or investor calls by executives of publicly traded companies. We encourage researchers to adopt this approach to study their institutions of interest and test their hypotheses. In doing so, they may find some refinements or adjustments to the methodology necessary. One area for further investigation is follow-up questions, particularly in unmoderated or less structured settings. To accurately assess the quality of answers to those questions, it may be necessary to consider a broader context, including prior questions.

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### Chapter 3

# CHALLENGER ENTRY AND ELECTORAL ACCOUNTABILITY

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#### 3.1 Introduction

Formal electoral agency models usually portray challengers as passive alternatives available to replace the incumbent if and when voters desire. Although this premise is plausible in economic contexts "where the market can readily provide a substitute for deficient manager-agents," it is likely to be faulty in elections (Gordon et al., 2007, p. 304). Indeed, due to the considerable cost of organizing an election campaign, empirical research has shown that candidates strategically decide whether and when to run for office (e.g., Cox & Katz, 1996, 2002; Jacobson, 1980; Jacobson & Kernell, 1983; Stone et al., 2004).

The endogeneity of candidates' entry decisions has two implications: (i) challengers strategically choose to run for office or forfeit, and (ii) this decision is based on a trade-off between their probability of winning and the cost of running a campaign. Consequently, "challengers may be deterred from running against incumbents who are perceived to [have] a high ability," because they expect a low probability of being elected (Ashworth & Bueno de Mesquita, 2008, p. 1006). Furthermore, "if entering a race is a costly action for a challenger, then the very fact that a race is competitive can convey valuable information to voters about the relative merits of challengers and incumbents" because some challengers may have higher incentives to run than others (Gordon et al., 2007, p. 303).

Formal political theory has previously studied the role of challengers in electoral accountability. For instance, Gordon et al. (2007) formulated a model of electoral competition with endogenous challenger entry with no policymaking involved. Ashworth and Shotts (2011) explored how challengers' public criticisms may strengthen the incumbent's incentives to carry out desirable policies. Dewan and Hortala-Vallve (2019) studied how a noisy signal about an opponent affects the incumbent's will-ingness to undertake a risky reform. Alexander (2021) analyzed policy competition between a valence-advantaged incumbent and a challenger. Finally, Izzo (n.d.)

showed that electoral accountability can deter good candidates from running during crises.

Like most electoral agency models, those analyzed by Ashworth and Shotts (2011), Dewan and Hortala-Vallve (2019), and Alexander (2021) operate under the premise that challengers always run for office. No existing model of electoral agency with adverse selection accounts for the endogeneity of challengers' decision to run. This article seeks to fill this void.

Given the empirical evidence that the intensity of electoral competition influences policymaking, endogenous challenger entry is not innocuous for electoral accountability (Gordon & Huber, 2007; Lim, 2013; Lim & Snyder, 2021). Its effect, however, is ambiguous. On the one hand, it incentivizes the incumbent to distort her policy decisions, as she expects challengers to cave in if she projects a sufficiently high level of ability, thereby boosting her reelection prospects. On the other hand, endogenous challenger entry can improve policymaking when electoral accountability indvertently influences policy decisions. The availability of viable challengers is indispensable for electoral accountability, allowing voters to discipline office-holders by threatening to replace them if they do not implement desired policies. Therefore, when a challenger surrenders to the incumbent, ensuring her automatic reelection, electoral accountability is weakened. Nevertheless, this outcome may be beneficial if electoral accountability negatively affects policymaking.

To resolve this ambiguity, I analyze a two-period model of electoral agency with three players: an Incumbent, a Challenger, and a Voter. In the first period, the Incumbent enacts one of two policies. The Challenger observes the Incumbent's policy decision and chooses whether to run or withdraw. If the Challenger withdraws, the Incumbent is automatically reelected. If the Challenger decides to run, the Voter updates their beliefs about the Incumbent's private characteristics and chooses whether to reelect her or replace her with the Challenger. In the second period, the elected candidate again enacts one of two policies.

I assume that politicians are simultaneously concerned with holding office and enacting policies that generate the most benefits during their tenure. Politicians' policy preferences align with the Voter's while in office, but they are indifferent between enacting a suboptimal policy and letting an opponent govern. Consequently, politicians are ready to distort their policy decisions to improve their reelection prospects. Politicians vary in their ability to discern the state of the world, which defines the optimal policy in each period. There are two types of politicians: high-ability politicians, who perfectly observe the state in each period, and low-ability ones, who only know its prior distribution. A sharper ability to discern the state allows politicians to enact optimal policies reliably. Therefore, the Voter seeks to elect a high-ability politician to hold office in the second period.

Unlike standard models, my model accounts for the possibility that the Incumbent's type is revealed before the election. As a result, candidates' electoral prospects depend directly on the Incumbent's type, not just the Voter's beliefs. All else equal, a high-ability incumbent has a greater reelection probability, and the Challenger's chances decline as the Incumbent's expected ability increases. This assumption is key for analyzing the effect of endogenous challenger entry on policymaking.

The Voter does not observe candidates' type but wishes to elect a high-ability politician. To this end, they infer candidates' hidden characteristics from their observable actions. In turn, the Incumbent can exploit the information asymmetry between herself and the other players to manipulate their beliefs about her type, thereby improving her reelection prospects. For instance, she can enact a policy that signals a high ability. Since the loss from enacting a suboptimal policy exceeds the benefits of securing reelection for a high-ability incumbent, the latter must implement the optimal policy. On the other hand, when a low-ability incumbent considers which policy to enact, she weighs the loss from enacting a suboptimal policy against the resulting increase in her reelection probability.

I analyze the model's equilibria assuming the Challenger learns his type only after the election, representing a scenario where his decision to contest the election is endogenous but uninformative about his type.

My analysis reveals that the first-order effect of endogenous challenger entry is to make policy distortions more valuable than when the Challenger always runs for office. The reason is that policy distortions now allow the Incumbent to secure reelection if she projects a high enough level of ability and dissuades the Challenger from running. Consequently, with endogenous challenger entry, the Incumbent is willing to distort her policy decisions under a broader range of conditions, specifically for larger values of the cost of enacting a suboptimal policy.

In cases where low-ability incumbents are initially willing to distort their policy decisions when the Challenger always runs, the effect of endogenous challenger

entry on policymaking is ambiguous: it can either worsen or ease policy distortions depending on model parameters. Indeed, while endogenous challenger entry creates additional incentives for the Incumbent to distort her policy decisions to dissuade the Challenger from running, it eliminates these incentives if the Challenger forfeits.

When endogenous challenger entry deepens policy distortions, it necessarily decreases voter welfare. In contrast, when endogenous challenger entry mitigates policy distortions, it can increase it. However, such an improvement is not guaranteed because endogenous challenger entry also disrupts electoral selection by preventing the Voter from replacing the Incumbent when she is exogenously revealed to have a low ability before the election. For endogenous challenger entry to improve voter welfare, the benefits from lower policy distortions must outweigh the losses from weaker electoral selection. I outline conditions under which endogenous challenger entry does improve voter welfare compared to when the Challenger always runs.

The findings outlined in this paper suggest a provocative implication: imposing barriers to entry in elections can, in some circumstances, improve policymaking and voter welfare.

This paper builds on a recent study by Camargo and Degan (2020) but takes a distinct and complementary approach. I describe three specific differences between our approaches. First, our models represent different policymaking environments. I analyze a model with adverse selection, whereas Camargo and Degan considered a model with moral hazard. The scope of electoral accountability is different in both models. In Camargo and Degan's model, electoral accountability pushes the Incumbent to exert more effort, resulting in better policy outcomes. In my model, it has adverse consequences, encouraging the Incumbent to enact suboptimal policies that enhance her reputation. It is significant that Camargo and Degan's findings hold in a different setting, like mine.

Second, the mechanisms underlying our findings differ. In my model, marginally increasing the cost of running for office reduces the level of ability the Incumbent must project to dissuade the Challenger from running, resulting in fewer policy distortions. In Camargo and Degan's model, all else equal, exerting more effort increases the likelihood of a policy success, an outcome that improves her reelection prospects. Accordingly, the Incumbent's incentives to exert more effort are proportional to the increase in her reelection probability resulting from a policy success. Higher barriers to entry in elections always increase the Incumbent's reelection probability, regardless of the success of her policies. Accordingly, the Incumbent

may exert more or less effort depending on whether their effect on her reelection prospects is greater when her policies succeed or fail.

Third, from a methodological perspective, I opt for a simpler and slightly less general model, wherein officeholders have finite rather than continuous choice sets, allowing for closed-form solutions to be derived. This choice streamlines the presentation of my findings and enhances the transparency of the conditions under which endogenous challenger entry strengthens and weakens electoral accountability.

This article is structured as follows. I begin by outlining my model. I then characterize and compare its equilibria with and without endogenous challenger entry. Using this comparison, I examine the welfare implications of endogenous challenger entry. Finally, I summarize my findings, discuss their implications, and identify open questions.

#### 3.2 Model

The description of the model proceeds in two steps. First, I outline the baseline framework adapted from Levy (2004) and Fox and Stephenson (2011) on which it builds. I subsequently describe how it departs from this framework.

The game occurs over two periods. In the first period, the Incumbent (she/her/hers) enacts either policy *a* or *b*. Her choice is denoted  $y_1 \in Y = \{a, b\}$ . The Voter (they/them/theirs) observes the Incumbent's policy decision and decides whether to reelect her or replace her with the Challenger (he/him/his). In the second period, the elected candidate enacts a policy  $y_2 \in Y$ .

In each period *t*, players' policy preferences depend on the state of the world, denoted  $\omega_t \in \Omega = \{a, b\}$ . The state is identically and independently distributed over time. One of the possible states is more likely than the other. Without loss of generality, in each period, there is a probability  $\pi > \frac{1}{2}$  that the state is *a*.

The Voter's policy preferences are represented by the utility function  $u : Y \times \Omega \to \mathbb{R}$ . Their preference is for the policy enacted in each period to match the state of the world. For simplicity, I assume that  $u(y_t, \omega_t) = \mathbf{1} \{y_t = \omega_t\}$ , meaning that the Voter receives a payoff of one when the policy equals the state, and zero otherwise. The state remains unknown to the Voter until the game's termination, preventing them from evaluating the efficacy of the Incumbent's first-period policy decision before the election. Politicians' preferences are represented by the utility function  $u_p : \{0, 1\} \times Y \times \Omega \to \mathbb{R}$ . This function is defined as  $u_p (o_t, y_t, \omega_t) = \mathbf{1} \{o_t = 1\} u (y_t, \omega_t)$ , where  $o_t$  equals one if the politician holds office in period t, zero otherwise. Also, I assume that the Incumbent applies a discount factor  $\delta \in (0, 1)$  to her second-period payoffs, which reflects the weight she assigns to career considerations. Under these preferences, politicians are simultaneously concerned with holding office and enacting policies that match the state during their tenure. While in office, politicians' policy preferences align with the Voter's such that, absent career considerations, there is no disagreement between them over which policy to implement. While out of office, politicians' payoffs are zero, implying their indifference between enacting a policy they dislike and having opponents govern.

Politicians have hidden characteristics. They differ in the quality of their information on the state of the world, encapsulated in their private type  $\theta \in \Theta = \{h, \ell\}$ , where *h* stands for high and  $\ell$  for low ability.  $\theta_i$  and  $\theta_c$  denote the Incumbent's and the Challenger's type, respectively. High-ability politicians have perfect knowledge of the state in each period, while low-ability politicians only know its prior distribution. The Incumbent and the Challenger come from different candidate pools, with a probability  $\kappa$  and  $\gamma$  of having a high ability, respectively. The Incumbent knows her type but is uncertain about the Challenger's. On the other hand, the Challenger is unaware of the Incumbent's type and his own.<sup>1</sup> Thus, while endogenously determined, the Challenger's decision does not convey information about his type.

My model departs from the previously described baseline framework in two ways:

(i) *Endogenous Challenger Entry.* The Challenger chooses whether to run for office or not.<sup>2</sup> Running for office is costly: the Challenger must incur a cost of c > 0 times his expected benefits from holding office in the second period.<sup>3</sup> Therefore, the Challenger enters the race only if the probability that

<sup>&</sup>lt;sup>1</sup>This assumption is consistent with standard assumptions in the career concerns literature (e.g., Holmström, 1999; Persson & Tabellini, 2002). It is plausible since the Incumbent, having previously held office, has had the opportunity to assess her ability, while the Challenger has not.

<sup>&</sup>lt;sup>2</sup>The model assumes that the Incumbent always seeks reelection. The Incumbent may enact the optimal policy regardless of her reelection prospects, effectively surrendering to the Challenger.

<sup>&</sup>lt;sup>3</sup>The parameter c represents the cost of running for office relative to the expected benefits of holding office in the second period. In general, the Challenger's expected benefits from holding office depend on his expected ability. This formulation neutralizes the effect of the Challenger's expected ability on his inclination to run for office when considering variations of c without altering my core findings.

Table 3.1: Notation

$\sigma$	Probability that low-ability incumbents enact policy $a$ in the first period
$ ho^y$	Probability that the Challenger runs for office after the Incumbent enacted policy $y$ in the first period
v <sup>y</sup>	Probability that the Voter reelects the Incumbent after she enacted policy $y$ in the first period
ĸ <sup>y</sup>	Posterior probability that the Incumbent has a high ability conditional on having enacted policy $y$ in the first period

he will be elected exceeds c; otherwise, the Challenger forfeits, resulting in the Incumbent's automatic reelection.

(ii) *Exogenous Information Disclosure*. Apart from the Incumbent's first-period policy decision, the Voter may directly observe her private type before the election. Specifically, there is a probability  $q_i \in (0, 1)$  that Nature publicly reveals the Incumbent's type before the election.<sup>4</sup>

The full sequence of events in the game is as follows:

- (i) The Incumbent enacts a policy  $y_1 \in Y$ ;
- (ii) The Challenger chooses whether to run for office;
- (iii) Nature may publicly reveal the Incumbent's type;
- (iv) The Voter updates their beliefs about the Incumbent's type and elects the candidate who will hold office in period 2; and
- (v) The elected candidate enacts a policy  $y_2 \in Y$ .

I adopt the perfect Bayesian equilibrium as this model's solution concept (Fudenberg & Tirole, 1991). Also, to eliminate equilibria based on unrealistic beliefs, I require

<sup>&</sup>lt;sup>4</sup>This mechanism differs from one publicly revealing the state of the world before the election, allowing the Voter to assess the efficacy of the Incumbent's policy decision. As demonstrated below, high-ability incumbents invariably enact the correct policy in equilibrium. Therefore, if the Incumbent enacted the wrong policy in the first period, she must have a low ability. Conversely, if the Incumbent enacted the correct policy, the Voter becomes more confident that she has a high ability, although some uncertainty remains. In contrast, when activated, my mechanism resolves all uncertainty about the Incumbent's type.

that the Voter's off-the-equilibrium-path beliefs adhere to the following condition: if the Challenger never (resp., always) runs for office, then his posterior probability of having a high ability contingent upon running (resp., not running) equals his prior probability of having a high ability. Table 3.1 presents the notation used to denote beliefs and strategies.

#### 3.3 Exogenous Information Disclosure and Candidates' Electoral Prospects

My model accounts for the possibility that Nature publicly reveals the Incumbent's type before the election. In this section, I show that this directly connects candidates' chances of being elected to the Incumbent's type. Specifically, holding the Voter's behavior constant, a high-ability Incumbent has a higher reelection probability. Analogously, the Challenger's probability of being elected decreases with the posterior probability of the Incumbent having a high ability. This feature distinguishes my model from standard electoral agency models, wherein the relationship between candidates' electoral prospects and the Incumbent's type operates exclusively through the Voter's beliefs and behavior.

To calculate candidates' probability of winning the election, we must determine who the Voter elects in the second period. In equilibrium, the Voter elects the candidate with the highest expected ability because they anticipate higher policy payoffs when a high-ability politician holds office in the second period. In the second period, the officeholder enacts the policy that maximizes policy payoffs based on their information about the state of the world. High-ability politicians, having perfect knowledge of the state, consistently enact the "correct" policy, whereas low-ability politicians enact policy *a*, committing a mistake with probability  $1 - \pi$ .

Consistently with the Voter's preference for the candidate with the highest expected ability, should Nature reveal that the Incumbent has a high ability, the Voter reelects her. In contrast, should Nature reveal that the Incumbent has a low ability, the Voter replaces her with the Challenger. When Nature does not reveal the Incumbent's type before the election, the Voter elects the candidate most likely to have a high ability based on their posterior beliefs conditional on the Incumbent's policy decision.

Overall, assuming the Challenger runs, the Incumbent's reelection probability after she enacts policy *y* equals:

$$\bar{\nu}_i \left(\theta_i, \nu^{y}\right) = \begin{cases} q_i \times 0 + (1 - q_i) \nu^{y} & \text{if } \theta_i = \ell \\ q_i \times 1 + (1 - q_i) \nu^{y} & \text{if } \theta_i = h \end{cases}$$

Analogously, if the Challenger runs for office after the Incumbent enacts policy *y*, his probability of being elected equals:

$$\bar{v}_{c} (\kappa^{y}, v^{y}) = \kappa^{y} [1 - \bar{v}_{i} (h, v^{y})] + (1 - \kappa^{y}) [1 - \bar{v}_{i} (\ell, v^{y})]$$
$$= q_{i} [\kappa^{y} \times 0 + (1 - \kappa^{y}) \times 1] + (1 - q_{i}) (1 - v^{y}).$$

The exogenous information disclosure mechanism is crucial for analyzing the effect of endogenous challenger entry on policymaking. The reason is that endogenous challenger entry affects policymaking only if the Incumbent seeks to project a level of ability different from when the Challenger always runs. In general, the Incumbent may improve her reelection prospects in two ways: (i) by altering the Voter's beliefs about who has the highest expected ability, or (ii) by dissuading the Challenger from entering the race. The latter stems specifically from endogenous challenger entry. Absent a direct connection between the Incumbent's type and the candidates' electoral prospects, this second mechanism becomes entangled with the first. In this case, the Incumbent's only way of influencing the Challenger's beliefs about his electoral prospects and entry decision is through the Voter's beliefs about who has the highest expected ability, just as when the Challenger always runs.

The exogenous information disclosure mechanism creates opportunities for endogenous challenger entry to affect policymaking. If there is a direct connection between the Incumbent's type and the candidates' electoral prospects, the Challenger always has a positive probability of winning. Indeed, there is always a chance that the Incumbent is exogenously revealed to have a low ability before the election, prompting the Voter to replace her. Therefore, the Challenger may find it valuable to run even after the Incumbent enacted a policy that makes her appear more attractive than the Challenger. Also, the Challenger's electoral prospects vary with the posterior probability that the Incumbent has a high ability beyond this point. Accordingly, the Incumbent may wish to distort her policy decisions beyond the level required to secure her reelection when her type is not revealed before the election. Analogously, even if the Incumbent does not find it worthwhile to distort her policy decisions to project a higher ability than the Challenger, she may still wish to distort her policy decisions enough to deter him from running.

#### 3.4 Equilibrium Analysis Without Endogenous Challenger Entry

In this section, I characterize the Incumbent's equilibrium first-period policy decisions when the Challenger always runs for office. This entry strategy is sequentially rational if running for office is costless. The Incumbent's policy decisions in this scenario represent the benchmark against which I later compare those made with endogenous challenger entry.

I begin by characterizing high-ability incumbents' equilibrium policy decisions. High-ability politicians perfectly observe the state of the world, allowing them to align their policy decisions with it. Given that the discount factor  $\delta$  is lower than one, the losses from enacting the wrong policy in the first period outweigh the benefits of securing reelection. Consequently, high-ability incumbents must enact the policy corresponding to the state in the first period. This fact persists when the Challenger's entry decision is endogenous. Thus, from this point onward, I focus on characterizing low-ability incumbents' policy decisions.

Since low-ability politicians only know the state's prior distribution, they maximize policy payoffs by enacting the policy associated with the most probable state, policy a. However, the Voter seeks to infer the Incumbent's type from her first-period policy decision. Consequently, the latter affects her reelection chances, prompting low-ability incumbents to distort it to enhance her reelection prospects.

To appreciate this, let us assume the Incumbent behaved to maximize policy payoffs in the first period. Then, the Voter would deduce that the Incumbent must have a high ability if she enacts policy b, ensuring her reelection. On the other hand, the Incumbent's reelection after enacting policy a would depend on the value of her posterior probability of having a high ability. In particular, if the posterior probability that the Incumbent has a high ability after enacting policy a were lower than the Challenger's expected ability, the Voter would replace the Incumbent with the Challenger when they do not exogenously observe her type before the election. In this case, low-ability incumbents have incentives "to 'posture' by taking [some] bold but unwarranted action" to improve their reelection prospects (Fox & Stephenson, 2011, p. 397).

In choosing which policy to enact, a low-ability incumbent weighs the loss from enacting policy b against the resulting improvement in her reelection prospects. Formally, it is sequentially rational for low-ability incumbents to enact policy a if and only if the expected payoffs from doing so over both periods are greater than those from enacting the alternative policy:

$$\pi + \delta \pi \ \bar{\nu}_i(\ell, \nu^a) \ge 1 - \pi + \delta \pi \ \bar{\nu}_i(\ell, \nu^b).$$

In equilibrium, the difference in reelection probabilities after enacting both policies must be lower than or equal to the loss from enacting policy b instead of policy a



Figure 3.1: Low-Ability Incumbents' Equilibrium Policy Decisions Without Endogenous Challenger Entry

relative to the expected benefits of holding office in the second period:

$$\bar{v}_i(\ell, v^b) - \bar{v}_i(\ell, v^a) \leq \frac{2\pi - 1}{\delta \pi}.$$

If the opposite were true, it would be sequentially rational for low-ability incumbents to enact policy b. In turn, if the Incumbent enacted policy a, the Voter would conclude that she had a high ability and reelect her. However, this would negate the electoral benefits associated with policy b, thereby eliminating the Incumbent's incentives to distort her policy decisions in the first place.

The maximal gain low-ability incumbents can achieve by posturing equals the range of their reelection probability, which is  $1 - q_i$  when the Challenger always runs. If the expected losses from enacting policy *b* relative to the benefits of holding office in the second period exceed this range, the Incumbent maximizes policy payoffs in equilibrium. In contrast, if they are lower than this range, the Incumbent places sufficient weight on her reelection prospects for posturing to be worthwhile.

As low-ability incumbents engage in posturing, the Voter updates their beliefs, and the electoral advantage associated with policy b falls. In equilibrium, low-ability incumbents distort their policy decisions to the extent that the posterior

probability that the Incumbent has a high ability after enacting some policy equals the Challenger's expected ability. In particular, if the Incumbent initially has a higher expected ability than the Challenger, she distorts her policy decisions to the extent that the Voter is indifferent after enacting policy a. Otherwise, she distorts her policy decisions to the extent that the Voter is indifferent after enacting policy b. Figure 3.1 illustrates the probability that low-ability incumbents enact policy a in equilibrium, represented on the vertical axis, as a function of the Incumbent's prior expected ability, represented on the horizontal axis.

# 3.5 Equilibrium Analysis With Endogenous Challenger Entry

In this section, I solve for the model's equilibria with endogenous challenger entry. I sequentially characterize the Challenger's entry decision, low-ability incumbents' reelection probability, and their first-period policy decisions.

#### The Challenger's Entry Strategy

It is sequentially rational for the Challenger to enter the election if and only if his expected probability of being elected, given the posterior probability that the Incumbent has a high ability, exceeds the relative cost of running:

$$\bar{v}_c(\kappa^y, v^y) \geq c.$$

After substituting the left-hand side's definition from Section 3.3 and simplifying, it appears that this inequality defines a threshold strategy such that the Challenger runs if and only if the posterior probability that the Incumbent has a high ability conditional on her first-period policy decision is below some threshold:

$$\kappa^{y} \le \frac{1 - (1 - q_{i}) v^{y} - c}{q_{i}}.$$
(3.1)

Equation (3.1) implies that the Incumbent's first-period policy decision directly impacts the Challenger's decision to participate in the election. Indeed, the Incumbent can dissuade the Challenger from standing in the election by enacting a policy suggesting a high probability that she has a high ability.

The threshold governing the Challenger's decision to enter the election depends on three variables: (i) the probability that Nature reveals the Incumbent's type before the election, (ii) the cost of running a campaign, and (iii) the probability that the Voter reelects the Incumbent absent exogenous information about her type before the election. All else equal, the Challenger's inclination to enter the race decreases as the latter increases.

In general, there is a range of possible threshold values below which the Challenger chooses to run for office, each corresponding to a value of  $v^y$ . However, sequential rationality imposes that the Voter elects the candidate most likely to have a high ability to hold office in the second period:

$$\kappa^{y} > (<) \gamma \Rightarrow \nu^{y} = 1 (0)$$

As echoed in Lemma 3.1, this requirement reduces the range of possible values to a single threshold for each value of the Challenger's expected ability.

**Lemma 3.1.** Given the Incumbent's first-period policy decision y and the posterior probability that she has a high ability, the Challenger runs for office in equilibrium if and only if:

$$\kappa^{\gamma} \leq \begin{cases} \bar{\kappa} & \text{if } \gamma > \bar{\kappa} \\ \gamma & \text{if } \gamma \in (\underline{\kappa}, \bar{\kappa}) \\ \underline{\kappa} & \text{if } \gamma < \underline{\kappa}, \end{cases}$$
(3.2)

where  $\underline{\kappa} = 1 - \frac{c}{q_i}$  and  $\overline{\kappa} = \frac{1-c}{q_i}$ . The Challenger may arbitrarily randomize his entry decision if this condition holds with equality. Further, if  $\gamma \in (\underline{\kappa}, \overline{\kappa})$ , the Challenger may arbitrarily randomize his entry decision only if the Voter reelects the Incumbent with probability  $v^y = \hat{v}$ , where  $\hat{v} = \frac{q_i(\overline{\kappa}-\gamma)}{1-q_i}$ , when the Incumbent's type is not exogenously revealed before the election; otherwise, the Challenger runs for office whenever  $v^y \leq \hat{v}$ .

There are three cases to consider depending on the relative intensity of the Challenger's motivation to contest the election.

The first case occurs when the prior probability that the Challenger has a high ability, which is the threshold above which the Voter finds the Incumbent more attractive than the Challenger, exceeds Equation (3.1)'s right-hand side if  $v^y = 0$ , denoted  $\bar{\kappa}$ . For instance, this occurs when the cost of running for office is high. In this case, the Challenger runs if the posterior probability that the Incumbent has a high ability is lower than  $\bar{\kappa}$  and may arbitrarily randomize his entry decision if it equals the latter. This means that the Challenger can be dissuaded from running even if he is more likely to have a high ability than the Incumbent, reflecting a weak motivation to run for office.

The second case occurs when the prior probability that the Challenger has a high ability is lower than Equation (3.1)'s right-hand side if  $v^y = 1$ , denoted  $\underline{\kappa}$ . For instance, this occurs when the cost of organizing a campaign is positive but low. In this case, the Challenger runs if the posterior probability that the Incumbent is lower than  $\underline{\kappa}$  and may arbitrarily randomize his entry decision if it equals to the latter. This means that the Challenger is willing to compete in the election even when the Incumbent has a higher expected ability than him, reflecting a strong motivation to run for office.

The third case occurs when the prior probability that the Challenger has a high ability is greater than the value of Equation (3.1)'s right-hand side if  $v^y = 1$  but lower than its value if  $v^y = 0$ , meaning that  $\gamma \in (\underline{\kappa}, \overline{\kappa})$ . In this case, the Challenger runs if he is more likely to have a high ability than the Incumbent and forfeits otherwise. If the candidates' expected abilities are equal, the Challenger may arbitrarily randomize his entry decision.

#### The Incumbent's Reelection Probability

Given the Challenger's entry strategy and the Voter's electoral choice, low-ability incumbents' reelection probability after enacting policy *y* in the first period equals:

$$\rho^{y} \bar{\nu}_{i} \left(\ell, \nu^{y}\right) + \left(1 - \rho^{y}\right) \times 1.$$

If the Challenger participates in the election, the Incumbent's reelection probability is as defined in Section 3.3. In this case, the Incumbent's reelection probability depends on: (i) the probability that Nature publicly reveals her type before the election, and (ii) her reelection probability when her type is not exogenously revealed before the election. On the other hand, if the Challenger withdraws, the Incumbent is reelected with certainty.

Lemma 3.2 defines low-ability incumbents' reelection probability as a function of the posterior probability that the Incumbent has a high ability, factoring in the Challenger's equilibrium entry strategy and the Voter's electoral behavior when the Incumbent's type is not exogenously revealed before the election. I denote this probability as  $\bar{v} (\kappa^{y})$ . I simplify the notation by denoting low-ability incumbents' reelection probability as an interval when all values within its range are consistent with equilibrium.

**Lemma 3.2.** In equilibrium, the reelection probability of low-ability incumbents, given the Incumbent's first-period policy decision y and the posterior probability that she has a high ability, equals:

$$(i) If \gamma < \underline{\kappa}:$$

$$\bar{\nu} (\kappa^{y}) = \begin{cases} 0 & if \kappa^{y} < \gamma \\ [0, 1 - q_{i}] & if \kappa^{y} = \gamma \\ 1 - q_{i} & if \kappa^{y} \in (\gamma, \underline{\kappa}) \\ [1 - q_{i}, 1] & if \kappa^{y} = \underline{\kappa} \\ 1 & if \kappa^{y} > \underline{\kappa}; \end{cases}$$

$$(ii) If \gamma \in (\underline{\kappa}, \overline{\kappa}):$$

$$\bar{\nu} (\kappa^{y}) = \begin{cases} 0 & if \kappa^{y} < \gamma \\ [0, 1] & if \kappa^{y} = \gamma \\ 1 & if \kappa^{y} > \gamma; \end{cases}$$

(*iii*) If  $\gamma > \bar{\kappa}$ :

	0	if $\kappa^y < \bar{\kappa}$
$\bar{\nu}\left(\kappa^{y}\right) = \left\{ \right.$	[0,1]	<i>if</i> $\kappa^y = \bar{\kappa}$
į	1	if $\kappa^y > \bar{\kappa}$

Figure 3.2 illustrates low-ability incumbents' equilibrium reelection probability as a function of the posterior probability that the Incumbent has a high ability conditional on her first-period policy decision. For comparison, low-ability incumbents' equilibrium reelection probability when the Challenger always enters the race is depicted with a dashed line.

Low-ability incumbents' reelection probability is a step function. A higher posterior probability that the Incumbent has a high ability improves her reelection prospects through two mechanisms, each associated with a "jump" in low-ability incumbents' reelection probability:

- (i) The Voter's decision to reelect or replace the Incumbent when her type is not exogenously revealed before the election; and
- (ii) The Challenger's decision to enter the race.



Figure 3.2: Low-Ability Incumbents' Reelection Probability With Endogenous Challenger Entry



(c)  $\gamma > \bar{\kappa}$ 

Figure 3.2: Low-Ability Incumbents' Reelection Probability With Endogenous Challenger Entry (Continued)

When the Challenger always runs, there is only one jump in low-ability incumbents' reelection probability associated with the first mechanism, occurring where the posterior probability that the Incumbent has a high ability equals the Challenger's expected ability. The discontinuity's height equals the likelihood that Nature does not exogenously reveal the Incumbent's type before the election. The second mechanism is inactive.

Endogenous challenger entry has three effects on low-ability incumbents' reelection probability. First, when the Challenger's motivation to run for office is the strongest, endogenous challenger entry can introduce a second discontinuity point at the threshold above which the Challenger withdraws his candidacy. Second, endogenous challenger entry can change the location of the existing discontinuity. For instance, when the Challenger's motivation to run is the weakest, the discontinuity in low-ability incumbents' reelection probability occurs at a lower value of the posterior probability that the Incumbent has a high ability, as the jump at which the Challenger withdraws his candidacy supersedes the original discontinuity at which the Voter changes their vote absent exogenous information disclosure. Third, endogenous challenger entry raises the total height of the discontinuities because the Incumbent can now dissuade the Challenger from running altogether, thereby securing her reelection.

# The Incumbent's Policy Decisions

Similarly to when the Challenger always runs, low-ability incumbents weigh the loss from enacting policy b against the electoral advantage it provides when choosing which policy to enact in the first period.

Low-ability incumbents' incentives to distort their policy decisions stem from the discontinuities in their reelection probability. If low-ability incumbents behave to maximize policy payoffs, the Voter will conclude that the Incumbent has a high ability after enacting policy b, resulting in her automatic reelection. Uncertainty about her type persists after enacting policy a. If the posterior probability that the Incumbent has a high ability after enacting policy a is lower than the value where a jump occurs, then low-ability incumbents' reelection probability depends on the policy they enact.

If the discontinuity is sufficiently large, low-ability incumbents will find it profitable to enact policy b with some probability to improve their reelection prospects. In this case, they distort their policy decisions to the extent that the posterior probability that the Incumbent has a high ability after enacting one of the policies equals the value at which the closest discontinuity occurs. Accordingly, the closer the Incumbent's prior probability of having a high ability is to the location of the jump, the more pronounced policy distortions will be.

Since endogenous challenger entry moves the discontinuities in low-ability incumbents' reelection probabilities, it inevitably affects policymaking. Propositions 3.1, 3.2, and 3.3 outline the key differences in low-ability incumbents' equilibrium policy decisions with and without endogenous challenger entry.

**Proposition 3.1.** Low-ability incumbents may distort their policy decisions in the first period when the Challenger's entry decision is endogenous but not when the Challenger always runs if:

$$\frac{2\pi-1}{\delta\pi}\in(1-q_i,1)\,.$$

Proposition 3.1 implies that the first-order effect of endogenous challenger entry is to increase the absolute value of policy distortions compared to when the Challenger

always runs. The reason is that the Incumbent can now secure her reelection by dissuading the Challenger from entering the race rather than facing the risk of being exogenously revealed to have a low ability before the election. This effect is reflected by the wider range of low-ability incumbents' reelection probability in Figure 3.2. Consequently, low-ability incumbents are willing to distort their policy decisions for larger values of the loss from enacting policy b. It follows that there are conditions under which they find it too costly to distort their policy decisions when the Challenger always runs but are willing to do so with endogenous challenger entry.

In circumstances where low-ability incumbents are willing to manipulate their policy decisions when the Challenger always runs, endogenous challenger entry can prompt changes in the magnitude of policy distortions. This effect is described in Proposition 3.2 and illustrated in Figure 3.3.

**Proposition 3.2.** Consider the case in which low-ability incumbents may distort their policy decisions when the Challenger always runs for office:

$$\frac{2\pi-1}{\delta\pi} < 1 - q_i.$$

In this case, endogenous challenger entry deepens policy distortions compared to when the Challenger always runs under the following conditions:

(i) 
$$\gamma < \underline{\kappa}, \frac{2\pi - 1}{\delta \pi} < \min \{q_i, 1 - q_i\}, and \kappa \in \left(\frac{\underline{\kappa}\gamma}{\pi \underline{\kappa} + (1 - \pi)\gamma}, \frac{\underline{\kappa}}{\underline{\kappa} + (1 - \underline{\kappa})\pi}\right); or$$
  
(ii)  $\gamma > \overline{\kappa} and \kappa < \frac{\gamma \overline{\kappa}}{\pi \gamma + (1 - \pi)\overline{\kappa}}.$ 

In contrast, endogenous challenger entry mitigates policy distortions compared to when the Challenger always runs if  $\gamma > \bar{\kappa}$  and  $\kappa \in \left(\frac{\gamma \bar{\kappa}}{\pi \gamma + (1-\pi)\bar{\kappa}}, \frac{\gamma}{\gamma + (1-\gamma)\pi}\right)$ .

In Figure 3.3, the vertical axis represents the equilibrium probability that low-ability incumbents enact policy *a* in the first period. A higher probability reflects fewer policy distortions. The horizontal axis represents the prior probability that the Incumbent has a high ability. Policy decisions made with endogenous challenger entry are illustrated with solid lines, while those made when the Challenger always runs are depicted with dashed lines. The shaded region highlights the ranges of values over which endogenous challenger entry worsens policy distortions, whereas the crosshatched area highlights the interval over which it mitigates policy distortions.



(b)  $\gamma > \bar{\kappa}$ 

Figure 3.3: Low-Ability Incumbents' Equilibrium Policy Decisions With Endogenous Challenger Entry

Endogenous challenger entry alters the severity of low-ability incumbents' policy distortions in three scenarios. First, when the Challenger's motivation to run for office is the strongest, endogenous challenger entry creates a second point around which the Incumbent distorts her policy decisions. This effect is illustrated in Figure 3.3's upper panel. Where low-ability incumbents' equilibrium reelection probability was previously constant between policies, and there were no incentives for posturing, the Incumbent can now dissuade the Challenger from running. If the cost of enacting policy b is sufficiently low, low-ability incumbents distort their policy decisions over this range to deter the Challenger from running for office. Therefore, endogenous challenger entry deepens policy distortions.

In this case, endogenous challenger entry alters the relationship between policy distortions and the prior probability that the Incumbent has a high ability. When the Challenger always runs, policy distortions increase before decreasing as the prior probability that the Incumbent has a high ability increases. With endogenous challenger entry, policy distortions initially increase, then decrease, before rising *again* as the prior probability that the Incumbent has a high ability nears the threshold at which the Challenger withdraws his candidacy. Policy distortions decrease once more after the Incumbent's prior expected ability surpasses this threshold. In other words, with endogenous challenger entry, the relationship between policy distortions and the prior probability that the Incumbent has a high ability takes the shape of a "W" rather than a "V."

Second, when the Challenger runs if and only if he is more likely to have a high ability than the Incumbent, multiple equilibria can arise, which vary in the probability that the Challenger runs for office and the likelihood of the Voter reelecting the Incumbent absent exogenous information about her type before the election. However, these equilibria ultimately result in the same policy decisions as in the benchmark scenario. Therefore, endogenous challenger entry does not alter low-ability incumbents' policy decisions.

Third, when the Challenger's motivation to run for office is the weakest, endogenous challenger entry causes a shift in the Incumbent's policy distortions. Specifically, it pulls them towards lower values of the prior probability that the Incumbent has a high ability as low-ability incumbents now manipulate their policy decisions to make the Challenger indifferent between running and forfeiting, at a lower posterior probability that the Incumbent has a high ability that the Incumbent has a high ability that the Incumbent has a high ability that the Voter indifferent between reelecting and replacing the Incumbent. This effect is illustrated

in Figure 3.3's lower panel. In this scenario, if the prior probability that the Incumbent has a high ability is low, endogenous challenger entry deepens policy distortions compared to when the Challenger always runs. Conversely, if the prior probability that the Incumbent has a high ability is high, endogenous challenger entry improves policymaking because the Challenger now withdraws from the election even if low-ability incumbents invariably enact policy a, leading to an uncontested election and eliminating low-ability incumbents' incentives to distort their policy decisions.

To conclude this section, I show that the magnitude of policy distortions can change non-monotonically with marginal variations in the cost of running for office. Under certain conditions, endogenous challenger entry can mitigate policy distortions when the Challenger's motivation to run for office is weak but exacerbate these distortions when motivation is strong. This suggests that increasing the cost of running for office at the margin may initially deepen policy distortions before easing them. Proposition 3.3 outlines specific conditions under which marginally increasing the cost of running for office improves policymaking locally.

**Proposition 3.3.** With endogenous challenger entry, the equilibrium probability that low-ability incumbents enact policy a in the first period marginally increases with the cost for the Challenger of running for office under the following conditions:

(*i*) 
$$\frac{2\pi - 1}{\delta \pi} < q_i \text{ and } q_i (1 - \kappa) < c < q_i \left( 1 - \max\left\{ \frac{\pi \kappa}{1 - (1 - \pi)\kappa}, \gamma \right\} \right); \text{ or}$$
  
(*ii*)  $1 - q_i \min\{\kappa, \gamma\} < c < 1 - \frac{q_i \pi \kappa}{1 - (1 - \pi)\kappa}.$ 

The first condition may hold only if  $\kappa > \gamma$  and the second condition only if  $\gamma > \frac{\pi \kappa}{1-(1-\pi)\kappa}$ .

There are two cases where increasing the cost of running for office reduces policy distortions at the margin. In the first case, the cost of running for office is so low that the Challenger is ready to run even if the Incumbent is more likely to have a high ability than him. In the second case, the cost is so high that the Challenger can be dissuaded from running even if he is more likely to have a high ability than the Incumbent. In both cases, the Incumbent's prior expected ability exceeds the threshold above which the Challenger forfeits but is not sufficiently high to deter him from running after the Incumbent enacts policy a in the first period, assuming she behaves to maximize policy payoffs. Thus, low-ability incumbents are motivated to

distort their policy decisions to dissuade the Challenger from entering the election after she enacts policy a.<sup>5</sup> The first set of conditions can only be satisfied if the Incumbent initially has a higher expected ability than the Challenger. On the other hand, the second set of conditions can only be satisfied if the Challenger has a sufficiently high expected ability relative to the Incumbent's and the probability that the state is a.

Marginally increasing the cost of running for office lowers the threshold at which the Challenger withdraws from the election. Consequently, low-ability incumbents need to distort their policy decisions to a lesser extent to dissuade the Challenger from running after the Incumbent enacts policy a, resulting in better policymaking under either set of conditions.

# 3.6 Welfare Implications of Endogenous Challenger Entry

In this section, I consider the welfare implications of endogenous challenger entry.

Depending on model parameters, endogenous challenger entry may worsen or alleviate low-ability incumbents' policy distortions in the first period. All else equal, fewer policy distortions increase voter welfare, and more policy distortions decrease it. However, endogenous challenger entry also affects the selection of officeholders in the second period. Elections not only represent a means for the Voter to punish or reward the Incumbent for their past actions but are also the occasion for them to pick who will hold office in the second period. Regardless of its effect on policymaking, endogenous challenger entry deprives the Voter of the opportunity to replace the Incumbent when the Challenger concedes the election, which is costly if the Incumbent is exogenously revealed to have a low ability before the election. As a result, the second-period officeholder has a lower expected ability with endogenous challenger entry.

In light of this, if endogenous challenger entry induces more policy distortions, it inevitably decreases voter welfare, with weaker electoral selection compounding its adverse effects on policymaking. If endogenous challenger entry reduces policy distortions, it is impossible to draw immediate conclusions about voter welfare because the adverse impact of endogenous challenger entry on electoral selection offsets, at least partly, the benefits of better policymaking. Whether endogenous challenger entry improves voter welfare depends on the magnitude of its positive

<sup>&</sup>lt;sup>5</sup>Additionally, the first set of conditions ensures that the loss from enacting policy b is sufficiently low to make it worthwhile for low-ability incumbents to distort their policy decisions.

effect on policymaking relative to its negative effect on electoral selection. Proposition 3.4 outlines the conditions under which endogenous challenger entry effectively improves voter welfare.

**Proposition 3.4.** *Endogenous challenger entry may improve voter welfare compared to when the Challenger always runs for office only under the following conditions:* 

- (i)  $\gamma > \bar{\kappa}$ ; and
- $\begin{array}{l} (ii) \ \ 2\pi 1 > q_i \gamma \ if \gamma > \frac{\bar{\kappa}}{\bar{\kappa} + (1 \bar{\kappa})\pi} = \frac{1 c}{\pi q_i + (1 \pi)(1 c)}, \ or \ [q_i \gamma (1 c)] \ (2\pi 1) > \\ q_i \gamma^2 \ [q_i (1 c)] \ (1 \pi) \ if \gamma < \frac{\bar{\kappa}}{\bar{\kappa} + (1 \bar{\kappa})\pi}. \end{array}$

When these conditions hold, endogenous challenger entry improves voter welfare if and only if the prior probability that the Incumbent has a high ability is in an interval containing the value max  $\left\{\gamma, \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}\right\}$  and contained in the interval  $\left(\frac{\gamma\bar{\kappa}}{\pi\gamma+(1-\pi)\bar{\kappa}}, \frac{\gamma}{\gamma+(1-\gamma)\pi}\right)$ .

Proposition 3.2 asserts that Condition (i) is necessary for endogenous challenger entry to lessen policy distortions. When this condition holds, there are fewer policy distortions if the Incumbent's expected ability is in the range  $\frac{\gamma \bar{\kappa}}{\pi \gamma + (1-\pi)\bar{\kappa}}$  to  $\frac{\gamma}{\gamma + (1-\gamma)\pi}$ . Endogenous challenger entry can only improve voter welfare in this range.

Over this interval, the benefits of endogenous challenger entry in terms of fewer policy distortions are maximized when the Incumbent's expected ability equals the highest of two values: the one at which policy distortions are the greatest without endogenous challenger entry ( $\gamma$ ), or the one above which low-ability incumbents no longer distort their first-period policy decisions with endogenous challenger entry  $(\frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi})$ . On the other hand, the loss from weaker electoral selection decreases with the Incumbent's expected ability because the opportunity to replace the Incumbent is valuable to the Voter when Nature reveals that she has a low ability before the election, an event becoming less likely when she has a higher expected ability. Therefore, if endogenous challenger entry improves voter welfare for some value of the Incumbent's expected ability, it must necessarily do so when the latter equals the highest of  $\gamma$  and  $\frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}$ . Condition (ii) captures the circumstances under which this occurs.

All else equal, Condition (ii) holds if the state a is sufficiently likely. The reason is that as this parameter increases, the cost of policy distortions increases while the

loss from having a low-ability politician hold office in the second period decreases, making it increasingly likely that the benefits from fewer policy distortions outweigh the losses from weaker electoral selection. This condition also depends on the Challenger's expected ability and the probability that Nature publicly reveals the Incumbent's type before the election. In general, whether this condition is satisfied depends ambiguously on their values because the benefits from fewer policy distortions and the losses from weaker electoral selection parallelly increase with these parameters. However, if  $\gamma > \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}$ , the effect of these parameters on the losses from weaker electoral selection dominates. In this case, Condition (ii) holds if and only if the Challenger's expected ability and the probability that Nature publicly reveals the Incumbent's type before the election are sufficiently low.

# 3.7 Conclusion

This paper fills a void in the formal literature on electoral accountability by incorporating endogenous challenger entry into a model of electoral agency with adverse selection. I use this model to study the effects of endogenous challenger entry on policymaking and voter welfare.

The first-order effect of endogenous challenger entry is to make policy distortions more valuable compared to when the Challenger always runs for office. The reason is that policy distortions now allow the Incumbent to completely secure her reelection if she projects a sufficiently high level of ability. Accordingly, with endogenous challenger entry, the Incumbent is willing to manipulate her policy decisions under a broader range of conditions.

In cases where low-ability incumbents are disposed to distort their policy decisions when the Challenger always runs, the effect of endogenous challenger entry on policy distortions is ambiguous: it can either deepen or mitigate policy distortions. I distinguish three scenarios. When the Challenger's incentives to run for office are the strongest, endogenous challenger entry creates a second point around which the Incumbent distorts her policy decisions, worsening policy distortions. When the Challenger's incentives to run are of moderate intensity, endogenous challenger entry does not affect the Incumbent's policy decisions in equilibrium. Finally, when the Challenger's incentives to run are the weakest, endogenous challenger entry shifts the Incumbent's policy distortions towards lower values of the prior probability that the Incumbent has a high ability. In this case, if the prior probability that the Incumbent has a high ability is sufficiently but not excessively high, endogenous challenger entry reduces policy distortions.

If endogenous challenger entry worsens policy distortions, it necessarily lowers voter welfare. On the other hand, if endogenous entry lowers policy distortions, it can increase voter welfare. However, this welfare improvement is not guaranteed because endogenous challenger entry weakens electoral selection. Therefore, the secondperiod officeholder's expected ability is lower than when the Challenger always runs. For endogenous challenger entry to improve voter welfare, the benefits from better policy decisions must outweigh the losses from weaker electoral selection. I characterized conditions under which endogenous challenger entry effectively improves voter welfare.

Overall, this paper's findings have a provocative implication: imposing barriers to entry in elections in the form of a higher cost of running for office can lead, in some circumstances, to better policy decisions and a welfare improvement for voters.

In conclusion, my analysis assumed that the Challenger's decision to participate in the election is endogenous but does not convey information about his type. If the Challenger knew his type when choosing to run for office or not, his decision could convey such information to the Voter. For instance, if the Challenger sometimes decided to withdraw, the Voter could infer that he is more likely to have a high ability when he runs (Gordon et al., 2007). Accordingly, the Incumbent's investments in deterrence could allow high-ability challengers to distinguish themselves from low-ability challengers. If this were the case, it would probably weaken low-ability incumbents' incentives to distort their policy decisions to dissuade the Challenger from running. Indeed, while deterrence is valuable when it works, it would backfire whenever the Challenger decided to run despite these efforts, as he becomes more appealing to the Voter then. I leave a complete analysis of this scenario for future research.

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# Chapter 4

# THE POLITICS OF SELF-IMPOSED TERM LIMITS

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### 4.1 Introduction

Some candidates for elected office pledge to step down at the end of their term if elected or reelected, a commitment that can be dubbed "self-imposed term limits" or "term limit pledges." For example, in 2022, Senator Pat Toomey from Pennsylvania chose not to seek a third term, in keeping with his earlier commitment to serve no more than two terms in the U.S. Senate.<sup>1</sup> Toomey had made a similar pledge before being elected to the House of Representatives, which he upheld by temporarily retiring from politics before running for the Senate. In France's 2017 presidential election, former Prime Minister Alain Juppé pledged not to seek a second term if elected. He made this commitment central to his campaign, with the slogan "One Term To Act."

At least one documented attempt was made to formalize self-imposed term limits, suggesting that the concept extends beyond anecdotal examples. In 1998, the people of Idaho approved a ballot initiative called *The Congressional Term Limits Pledge Act*. The law allowed congressional candidates to sign a pledge to serve no more than three terms in the U.S. House of Representatives and two in the Senate. If candidates took this pledge, the ballot would have stated it, with a warning added if they later broke their commitment.

At first glance, term limit pledges present a paradox. For office-motivated candidates, they are effectively self-inflicted wounds, reducing the length of their careers and the benefits they can expect from holding office over time. Furthermore, these pledges turn the candidates who take them into "lame ducks," weakening electoral accountability and potentially leading to undesirable outcomes. Indeed, electoral accountability depends on the prospect of reelection and voters' ability to deny it.

<sup>&</sup>lt;sup>1</sup>There are also instances of politicians who break such promises, such as Senator Ron Johnson from Wisconsin in 2022.

Without the fear of losing reelection, politicians may take measures contrary to their constituents' interests without repercussions.

Why would candidates then *voluntarily* pledge to term limits? The existing literature on term limits suggests a rationale for this. Although term limits restrict voters' ability to reelect incumbents, they can still benefit voters (Smart & Sturm, 2013). The reason is that while electoral accountability is often beneficial, it can also generate harmful incentives (Ashworth, 2012; Gersen & Stephenson, 2014). For instance, through their observable actions, officeholders may distort voters' perceptions of their hidden traits to enhance their reelection prospects at their constituents' expense. Term limits curb these incentives by limiting reelection opportunities. If term limits benefit voters, a candidate could, in turn, plausibly gain an electoral advantage by voluntarily committing to them, potentially outweighing their pledge's costs. Although the literature has demonstrated that term limits can benefit voters, it has yet to confirm their potential as signaling devices candidates can use to their benefit.

This article considers how self-imposed term limits can arise endogenously within a formal model of electoral accountability. My analysis builds on a standard twoperiod political agency model. In each period, a politician must choose between two policies. Payoffs in each period depend on the officeholder's policy decision and an unknown state of the world, about which politicians observe a noisy signal. Politicians seek to win and retain elected office and to enact specific policies during their tenure. Their policy preferences are concealed from the representative Voter and may either align with or diverge from the Voter's preferences. In the second period, the Voter prefers the behavior of one type of politician (labeled "strong") over the other (labeled "weak"). After the first period, the Incumbent competes for reelection against a Challenger, and the Voter elects to hold office in the second period the candidate they believe is most likely to be strong. The Incumbent can strategically distort her first-period policy decision to influence the Voter's beliefs about her strength, thereby improving her reelection prospects.

At the beginning of this standard setup, I append an election campaign during which two a priori identical candidates compete and can commit not to seek a second term. This process determines the Incumbent's identity in the first period, which is typically considered exogenous. It is a distinctive feature of my theoretical framework.

In contrast to the conventional approach in the literature on strategic information transmission with costly signaling, term limit pledges impose costs on both candidates and the Voter. For candidates, the cost of self-imposed term limits stems from their political careers' shortened length. For voters, the cost stems from their lost ability to choose between the Incumbent or the Challenger to hold office in the second period. Accordingly, to be elected, a candidate who has pledged to term limits must provide sufficiently higher policy payoffs to the Voter in the first period than a candidate eligible for reelection, creating a significant barrier to supporting term limit pledges in equilibrium.

The first contribution of my analysis is to reveal a strong connection between selfimposed term limits and informative cheap talk in elections, which Kartik and Van Weelden (2019) previously studied. In equilibria with informative cheap talk, some weak candidates signal their type to the Voter, resulting in their automatic dismissal at the next election. These candidates effectively pledge to term limits. This result is significant as it confirms that self-imposed term limits are not merely theoretical constructs but arise organically in models of elections with strategic information transmission. Other equilibria exist in which strong candidates voluntarily pledge to term limits, provided they have credible commitment power. These equilibria are sustainable under a broader range of conditions.

In this case, self-imposed term limits allow candidates to reveal their type to the Voter. In particular, by taking a term limit pledge, candidates demonstrate that they prioritize policymaking and enacting optimal policies during their single term in office, even at the cost of abandoning their long-term political ambitions. This grants them an electoral advantage over reelection-seeking candidates. While this preference occurs endogenously in my model, it reflects the common belief that voters disapprove of politicians excessively concerned with their reelection.

The information conveyed by term limit pledges helps the Voter make more informed electoral choices. However, this alone does not outweigh the losses from electing a candidate ineligible for reelection. Instead, the primary appeal of candidates who pledge to term limits lies in their independence from career concerns, enabling them to make policy decisions without electoral pressures. By changing their reputation relative to the Challenger, self-imposed term limits also affect the policy decisions of candidates who do not take them and still encounter career concerns. I show that for term limit pledges to improve the Voter's welfare, they must alter the Incumbent's behavior in the presence of career concerns and, particularly, bring it more into line with the Voter's preferences.

Although politicians may generally differ along various traits, I characterize the equilibria of a model specification in which politicians differ specifically in their policy preferences. In this setup, self-imposed term limits can arise under a broad set of parameters. I demonstrate that in equilibria where the Incumbent distorts her decisions toward the ex-ante suboptimal policy if and only if she is strong, term limit pledges can simultaneously be informative and improve voter welfare. In other words, when strong politicians distort the Voter's beliefs by enacting an unexpected policy, term limit pledges may arise and benefit the Voter. This finding confirms the existence of plausible circumstances under which term limit pledges can simultaneously be informative and improve voter welfare.

This article has the following structure. First, I discuss the relationship between this work and the existing literature. Next, I introduce the theoretical framework underpinning my analysis. The analysis proceeds in two parts: the first considers self-imposed term limits at a high level of generality, whereas the second explores self-imposed term limits within the specific context of electoral competition between candidates with different policy preferences. I conclude by summarizing my key findings and reflecting on their implications.

# 4.2 Related Literature

This article contributes to the formal literature on electoral accountability. My analysis builds on a standard two-period model with adverse selection and binary policy, state, type, and signal spaces. In this model, a politician's type may represent their policy preferences, policy-relevant private information, or a combination of both. Consequently, my theoretical framework bridges two research strands: one focused on hidden ability (e.g., Canes-Wrone et al., 2001; Levy, 2004; Prendergast & Stole, 1996) and the other on hidden preferences (e.g., Maskin & Tirole, 2004). The latter part of my analysis considers a setting where politicians specifically differ in their policy preferences.

My analysis also contributes to the literature on strategic information transmission with costly messages and lying costs, particularly in elections (Agranov, 2016; Banks, 1990; Callander & Wilkie, 2007; Huang, 2010). Like Kartik and Van Weelden (2019), I endogenize the identity of the Incumbent by appending an election campaign to a standard political agency model. It allows candidates to signal information about their private characteristics before policymaking begins, thereby linking their election-stage announcements to their subsequent policy decisions.

The key difference between Kartik and Van Weelden (2019)'s approach and mine is that I allow candidates to communicate through the decision to seek a second term, whereas they restrict candidates to cheap-talk communication. However, although Kartik and Van Weelden do not present it in this way, term limit pledges naturally emerge in their model. To complement their analysis, I explore the equilibria that require commitment power.

Finally, this paper contributes to the literature on term limits. Cain and Levin (1999) provide a comprehensive review of the early work on the empirical and normative implications of term limits. In this extensive body of research, I introduce the concept of self-imposed term limits. The rationale I propose mirrors that of Smart and Sturm (2013) for standard term limits.

# 4.3 Model

#### **Players and Actions**

My model spans three periods, labeled 0 through 2. In period 0, two first-period candidates compete in an election campaign. Both candidates simultaneously announce whether they intend to seek reelection, with the option to voluntarily forgo reelection and commit to retiring after their next term. The representative Voter simultaneously observes both candidates' announcements, updates their beliefs about each candidate's type, and chooses one to serve as the Incumbent.

In the two subsequent periods t = 1, 2, a politician chooses a policy  $y_t \in Y = \{a, b\}$  observed by all. The politician who holds office in period 1 is the Incumbent. Following his choice of  $y_1$ , the Voter updates their beliefs about the Incumbent's type. The Voter also observes a noisy signal of the Challenger's strength. If the Incumbent is eligible for reelection, the Voter chooses whether to reelect her. If the Incumbent does not seek reelection or is defeated by the Challenger, the Challenger replaces her in period 2.<sup>2</sup>

#### **Payoffs and Information Structure**

In each policymaking period, players' payoffs depend on: (i) the policy implemented by the officeholder, and (ii) the state of the world. The state, denoted  $\omega_t \in \Omega$  =

<sup>&</sup>lt;sup>2</sup>No explicitly defined election stage between two candidates follows the Incumbent's retirement. Instead, an exogenous process randomly selects a challenger, potentially after a competitive stage during which many candidates publicly announce their reelection plans. The only constraint is that the Incumbent's decision to seek reelection cannot influence this process' outcome or, in other words, there can be no "scare-off" effect.

 $\{a, b\}$ , is drawn independently and identically over time. Without loss of generality, I assume state *a* is more likely:

$$P\left(\omega_t=a\right)=\pi>\frac{1}{2}.$$

The Voter's policy preferences are represented by the utility function  $u_v : Y \times \Omega \to \mathbb{R}$ . I assume that the Voter wishes the policy implemented in each period to match the state:

$$u_{v}(x,x) > u_{v}(x',x), \forall x,x' \in \{a,b\}, x \neq x'.$$

This assumption does not imply that policy a is the Voter's ex-ante favorite policy, as this also depends on the magnitude of the loss from enacting the suboptimal policy in each state.

Each politician has a constant and private type  $\theta_j \in \Theta = \{s, w\}$ , where *s* stands for strong and *w* for weak. I define strong politicians as those whose policy decisions in period 2 result in greater payoffs for the Voter. Strength reflects the qualities that make a politician's policy decisions more beneficial to the Voter in the absence of career concerns. Accordingly, the Voter will elect the politician most likely to be strong to hold office in period 2.

The first-period candidates and the Challenger are drawn from different pools. The first-period candidates' types, labeled  $\theta_j$ , j = 1, 2, are identically and independently distributed according to the following probability distribution:

$$P\left(\theta_{j}=s\right)=\kappa.$$

On the other hand, for tractability, I assume that the Challenger, whose type is denoted  $\theta_c$ , has an equal probability of being weak or strong:

$$P\left(\theta_c=s\right)=\gamma=\frac{1}{2}.$$

Before choosing whether to reelect the Incumbent or replace her with the Challenger, the Voter observes a noisy signal about the latter's type. This feature incorporates probabilistic voting into the model, meaning that the Incumbent's reelection probability depends on the intensity with which her policy decisions in period 1 signal strength. I remain agnostic over the signal's exact form. Since the analysis only demands the marginal distribution of the Voter's posterior beliefs, I focus on modeling that aspect. The posterior probability that the Challenger is strong, denoted  $\tilde{\gamma}$ , follows a probability distribution defined on the unit interval with a cumulative distribution function *F*. This distribution must satisfy "Bayesian plausibility," meaning that the expected posterior probability equals the prior probability that the Challenger is strong:

$$E\left[\tilde{\gamma}\right]=\gamma.$$

For tractability, I assume that the posterior probability that the Challenger is strong is uniformly distributed:

$$\tilde{\gamma} \sim \mathcal{U}([0,1])$$
.

Politicians' policy preferences and the quality of their policy-relevant private information depend on their type. Unlike the Voter, politicians may not seek to align policy decisions with the state. The utility function  $u_p : Y \times \Omega \times \Theta \rightarrow \mathbb{R}$  captures their preferences, which vary with their type. In this analysis, I assume that strong politicians' preferences align with the Voter's, while the weak politicians' preferences are opposite:

$$\begin{aligned} \theta_j &= s: \qquad u_p\left(y, \omega, s\right) = u_v\left(y, \omega\right), \forall y \in Y, \omega \in \Omega \\ \theta_j &= w: \quad u_p\left(y, \omega, w\right) = u_v\left(y', \omega\right), \forall y, y' \in Y, y \neq y', \omega \in \Omega. \end{aligned}$$

Under this assumption, politicians have a belief threshold  $\bar{\pi}$  such that, in the absence of career concerns, a strong (resp., weak) politician wishes to enact policy *a* if her posterior belief that the state is *a* exceeds (resp., falls below) this threshold, and policy *b* if it does not. The threshold  $\bar{\pi}$  is defined by the posterior belief for which politicians are indifferent between enacting both policies:

$$\bar{\pi} = \frac{u_v(b,b) - u_v(a,b)}{u_v(a,a) - u_v(b,a) + u_v(b,b) - u_v(a,b)}$$

I normalize politicians' payoffs to zero when they are out of office, implying that they are indifferent to the decisions made while they are not in office. I further assume that politicians' utility function is such that they always prefer to hold power rather than being out of office.<sup>3</sup> Therefore, politicians seek office whenever they can, and not pledging to term limits at the election stage is equivalent to a candidate announcing that she will seek reelection. The Incumbent discounts her period 2 payoffs using the notional discount factor  $\delta > 0$ , which measures the intensity of her

<sup>&</sup>lt;sup>3</sup>For this assumption to be satisfied, it suffices that politicians receive a sufficiently valuable rent in each period they are in office.
career concerns. For simplicity, I assume the Voter does not discount their period 2 payoffs.

These preferences reflect a mixture of office and policy motivations. Politicians care about the policies they implement while in office, having a strict preference for one policy conditional on the state. However, they also place significant value on holding office such that they prefer to enact a suboptimal policy rather than lose their seat. Accordingly, the Incumbent may strategically distort her policy decisions in period 1 to improve their reelection prospects. In contrast, politicians are no longer concerned about their careers in period 2, as they necessarily end after this period. Therefore, they enact their preferred policy. For this reason, the Voter seeks to elect a congruent politician to hold office in period 2.

In each policymaking period, politicians receive a private signal  $s_t \in S = \{a, b\}$  about the state of the world. Although the quality of politicians' policy-relevant private information may generally depend on their type, I assume here that it is uniform across both types and sufficiently precise to influence the politicians' optimal policy decisions in the absence of career concerns:

$$P(s_t = \omega_t | \omega_t) = q \in \left(\frac{\max\{\pi (1 - \bar{\pi}), (1 - \pi)\bar{\pi}\}}{\pi (1 - \bar{\pi}) + (1 - \pi)\bar{\pi}}, 1\right).$$

#### **Equilibrium Concept, Beliefs, and Strategies**

I use the perfect Bayesian equilibrium as this model's solution concept. To eliminate equilibria based on unreasonable beliefs, I require that players' off-the-equilibrium-path beliefs satisfy the D1 Criterion (Banks & Sobel, 1987; Cho & Kreps, 1987; Fudenberg & Tirole, 1991). To ensure that candidates' nominal identity does not convey any information relevant to the Voter's electoral behavior, I impose two additional restrictions on the players' strategies:

- (i) Candidates' strategies must be *symmetric*, meaning that conditional on their private type, all candidates should play according to the same strategy.
- (ii) The Voter's strategy must be *equitable*, in the sense that they should react symmetrically to both candidates' election-stage announcements and policy decisions.

Equitability requires the Voter to elect each candidate with equal probability if they made identical announcements at the election stage. Combined with symmetry, equitability also implies that if the candidates make opposite announcements, the Voter

must elect a candidate who pledged to term limits against one seeking reelection with the same probability, irrespective of their nominal identity.

Table 4.1 presents the notation used to denote players' strategies and beliefs. If she pledges to term limits, the Incumbent takes the same action in period 1 that she would choose in period 2. Thus, I only record the Incumbent's policy decision in period 1 if she is eligible for reelection (hereafter, in the presence of career concerns) and politicians' decisions in period 2 (hereafter, in the absence of career concerns).

$\sigma^\circ_ heta$	Probability that a type $\theta$ candidate pledges to term limits at the election stage
$\sigma_{\theta}^{s=x}$	Probability that a type $\theta$ politician enacts policy <i>a</i> in the presence of career concerns given the signal <i>x</i>
$\tilde{\sigma}_{\theta}^{s=x}$	Probability that a type $\theta$ politician enacts policy <i>a</i> in the absence of career concerns given the signal <i>x</i>
v°	Probability that the Voter elects a candidate who has pledged to term limits over one seeking reelection
$ u^{y}\left( ilde{\gamma} ight)$	Probability that the Voter reelects the Incumbent after she has enacted policy y given that the posterior probability of the Challenger being strong is $\tilde{\gamma}$
ĸ°	Posterior probability that a candidate who has pledged to term limits is strong
ĥ	Posterior probability that a candidate who has not pledged to term limits is strong
ĸ <sup>y</sup>	Posterior probability that the reelection-seeking Incumbent is strong after enacting policy <i>y</i>
$\tilde{\gamma}$	Posterior probability that the Challenger is strong

#### 4.4 Analysis

The analysis proceeds in two parts. In the first part, I investigate the conditions under which self-imposed term limits can arise in equilibrium, seeking to elucidate their context and motivations. I adopt a general analytical approach, focusing on the implications of sequential rationality and belief consistency for the shape of equilibria with term limit pledges. This part addresses four key questions:

(i) What motivates candidates to pledge to term limits?

- (ii) Under what circumstances does the Voter favor electing a candidate who has pledged to term limits?
- (iii) Who values more their reelection prospects: reelection-seeking candidates or those bound by voluntary term limits?
- (iv) Under what conditions do self-imposed term limits improve voter welfare?

In the second part, I consider a setting representing electoral competition between congruent and non-congruent politicians and derive plausible conditions under which self-imposed term limits are simultaneously informative and improve voter welfare.

#### What Motivates Candidates to Pledge to Term Limits?

First, I examine the implications of the sequential rationality of first-period candidates' election-stage announcements for self-imposed term limits.

Term limit pledges are costly for candidates because they require them to forfeit the opportunity to run for and potentially hold office in period 2. By following her policy preferences in period 1, regardless of her reelection prospects, the Incumbent ensures that her expected payoffs from being elected and seeking reelection will be at least as high as those from being elected but not seeking reelection. This implies that the Incumbent's expected payoffs without career concerns represent her reservation value. Therefore, to forgo reelection, candidates must receive compensation in the form of an increased probability of being elected in period 1. In other words, selfimposed term limits must provide an electoral advantage over reelection-seeking candidates at the election stage. Proposition 4.1 formalizes this reasoning.

**Proposition 4.1.** In equilibria where candidates pledge to term limits with a strictly positive probability, the Voter must elect with a higher likelihood a candidate who has pledged to term limits than one who has not:

$$v^{\circ} \geq \frac{1}{2}.$$

# When Does the Voter Favor Electing a Candidate Who Has Pledged to Term Limits?

Proposition 4.1 stipulates that a candidate who has pledged to term limits must have a higher probability of being elected, thereby gaining an advantage over reelectionseeking candidates. In turn, candidates can pledge to term limits in equilibrium only if the Voter prefers to elect a term-limited candidate over a reelection-eligible one. I consider the implications of this, given the Voter's sequential rationality at the election stage and belief consistency, for the nature and circumstances of term limit pledges.

Proposition 4.2 affirms that, in equilibrium, candidates can pledge to term limits with strictly positive probability only if seeking reelection does not perfectly reveal a candidate's type.

**Proposition 4.2.** In equilibria where candidates pledge to term limits with a strictly positive probability, there must be uncertainty about the type of a candidate who does not pledge to term limits and thereby seeks reelection:

$$\hat{\kappa} \in (0,1)$$
.

Suppose by way of contradiction that the Incumbent was known to be weak when she sought reelection. In this case, the Voter would prefer to replace the Incumbent with the Challenger even if they could retain her. As a result, term limit pledges effectively become a costless signal. All candidates would then prefer taking one since it provides an electoral advantage, contradicting the premise that the Incumbent pledges to term limits only when she is weak.

Alternatively, suppose that the Incumbent was known to be strong when she sought reelection. In this case, the Voter would never elect a candidate who has pledged to term limits as the best possible outcome is electing a reelection-eligible candidate known to be strong, a choice available to them. In light of Proposition 4.1, this also contradicts the assumption that only strong candidates seek reelection since no candidate would willingly pledge to term limits under these conditions.

\* \*

Proposition 4.2 implies that in any equilibrium where candidates pledge to term limits with positive probability, both types of candidates must also seek reelection with positive probability. Therefore, perfect separation is impossible: at most, candidates may randomize between pledging to term limits and seeking reelection. In turn, for this to be sequentially rational, candidates must be indifferent between both election-stage announcements. However, because strong and weak candidates have different payoff structures, equilibria in which both types are simultaneously indifferent between announcements do not generically exist. Instead, in any equilibrium where term limit pledges occur with positive probability, only one type makes such pledges, thereby revealing their type. Uncertainty about candidates' type persists when they seek reelection.

Proposition 4.3 stipulates a necessary condition for weak candidates to pledge to term limits in equilibrium.

**Proposition 4.3.** In equilibria where weak candidates pledge to term limits with a strictly positive probability, the Voter must prefer a known weak Incumbent who has forgone reelection to an Incumbent with expected strength  $\hat{\kappa} \in (0, 1)$  who is eligible for reelection:

$$\hat{\kappa} E_{\sigma_s} \left[ u_v \right] + (1 - \hat{\kappa}) E_{\sigma_w} \left[ u_v \right] < E_{\tilde{\sigma}_w} \left[ u_v \right].$$
(4.1)

Electing a candidate who has pledged not to seek reelection is costly for the Voter because they then lose the ability to choose who gets to hold office in period 2 based on the Incumbent's policy choices in period 1, undermining electoral selection and decreasing the officeholder's expected strength in period 2. The redeeming benefit of self-imposed term limits is that they shield candidates from career concerns, eliminating incentives to engage in harmful policy distortions. Accordingly, to compensate for the lower policy payoffs expected in the second term, the Voter expects term-limited candidates to enact better policies in period 1 than reelection-eligible candidates; otherwise, the Voter finds it inevitably harmful to elect them over a reelection-seeking candidate.

Equation (4.1) defines conditions under which policy distortions in period 1 are so harmful that the Voter favors a known weak Incumbent abstaining from policy distortions over a potentially strong Incumbent engaging in such distortions. In this case, the Voter prefers a "known devil" to a "possible angel," which is tantamount to a reversal of the Voter's preferences over politicians' types. While the Voter prefers strong candidates to weak candidates in period 2, they favor a known weak candidate over a candidate having a positive probability of being strong in period 1. These preferences underscore that, to sustain term limit pledges, it is not sufficient for candidates who pledge to term limits to be stronger. In equilibria where weak candidates pledge to term limits with strictly positive probability, voters' preferences over candidates at the election stage must be non-monotonic in their expected strength. Acemoglu et al. (2013), Morelli and Van Weelden (2013), Fox and Stephenson (2015), Ash et al. (2017) and Kartik and Van Weelden (2019) study theoretical frameworks where this condition may hold.

Proposition 4.4 stipulates a necessary condition analogous to Equation (4.1) for equilibria where strong candidates pledge to term limits.

**Proposition 4.4.** In equilibria where strong candidates pledge to term limits with a strictly positive probability, the Voter must prefer a known strong Incumbent who has forgone reelection to an Incumbent with expected strength  $\hat{\kappa} \in (0, 1)$  who is eligible for reelection:

$$\hat{\kappa} E_{\sigma_s} \left[ u_v \right] + (1 - \hat{\kappa}) E_{\sigma_w} \left[ u_v \right] < E_{\tilde{\sigma}_s} \left[ u_v \right].$$
(4.2)

This condition is less restrictive than Equation (4.1). Since strong politicians are more desirable than weak politicians in the absence of career concerns, it is reasonable to expect them to remain more attractive than a potentially weak Incumbent in the presence of career concerns. In this context, Equation (4.2) should hold under a broader range of conditions.

I conclude this section by considering the implications of the sequential rationality of the Voter's electoral choices on the enforceability of term limit pledges. In equilibria where weak candidates pledge to term limits, commitment power is not necessary to enforce them. The reason is that the Incumbent is then known to be weak upon forgoing reelection. In this case, the Voter would inevitably opt to replace her with the Challenger even if the opportunity to retain the Incumbent in period 2 were available. This implies that term limit pledges taken by weak candidates are equivalent to informative cheap talk. In light of this, Proposition 4.3 echoes Kartik and Van Weelden (2019)'s findings about the scope of cheap-talk communication in elections: it can be informative in equilibrium only if the Voter prefers "a politician who is known to be [weak] over one whose [strength] is sufficiently uncertain" because "uncertainty about an elected official's [strength] generates policy-making distortions due to [...] career concerns" (Kartik & Van Weelden, 2019, p. 755).

In contrast, when strong politicians pledge to term limits, enforcing these pledges requires commitment power. In this case, the Incumbent's decision to forgo reelection signals strength. Consequently, the Voter would prefer to reelect rather than replace her with the Challenger in period 2. Since the Incumbent prefers remaining in office, she is better off breaking her promise and seeking reelection. Without commitment power to stop her, self-imposed term limits ultimately break down.

From now on, I assume the Incumbent has commitment power and focus on equilibria where strong candidates pledge to term limits with positive probability while weak candidates always seek reelection. These are the only partially separating equilibria that can occur when cheap-talk communication is uninformative. For an analysis of equilibria where weak politicians pledge to term limits, see Kartik and Van Weelden (2019).

#### Which Candidates Place the Greatest Value on Their Reelection Prospects?

I now consider which type of candidate places the most value on their reelection prospects in equilibria where strong candidates pledge to term limits. This analysis revisits the implications of the sequential rationality of first-period candidates' election-stage announcements for the nature and conditions of self-imposed term limits.

Pledging to term limits is costly for candidates. Sequential rationality of the firstperiod candidates' election-stage announcements implies that, in equilibria where strong candidates commit to term limits, this cost must be lower for strong candidates than for weak candidates. Proposition 4.5 says that this condition is satisfied only if a strong Incumbent derives relatively lower benefits than a weak Incumbent from the policies they enact in the presence of career concerns relative to their payoffs in the absence of career concerns.

**Proposition 4.5.** In equilibria where strong politicians pledge to term limits with a strictly positive probability, equilibrium policy payoffs in period 1 must be lower for a strong Incumbent than for a weak Incumbent relative to their respective payoffs in the absence of career concerns:

$$\frac{E_{\sigma_s}\left[u_p \middle| \theta_j = s\right]}{E_{\tilde{\sigma}_s}\left[u_p \middle| \theta_j = s\right]} \le \frac{E_{\sigma_w}\left[u_p \middle| \theta_j = w\right]}{E_{\tilde{\sigma}_w}\left[u_p \middle| \theta_j = w\right]}.$$

The cost of term limit pledges for candidates consists of two key components. First, by pledging to term limits, candidates forfeit the opportunity to seek reelection and remain in office in period 2. However, once the Incumbent pledges to term limits, she no longer has incentives to distort her policy decisions in period 1. This partially offsets the first component since distortions away from her preferred policy decisions

decrease her policy payoffs. By pledging to term limits, a candidate recoups the losses that would otherwise have resulted from these distortions. Therefore, the cost of term limit pledges is inversely proportional to the extent of the Incumbent's policy distortions in period 1. In other words, the more significant the policy distortions in the first term, the lower the relative value of reelection compared to serving a single term.

In equilibrium, a strong Incumbent is more likely to be reelected than a weak Incumbent. Accordingly, when accounting only for the benefits of seeking reelection and potentially holding office in period 2, the cost of term limit pledges is inevitably lower for weak candidates. For strong candidates to bear a lower overall cost, the value of the lost opportunity to hold office in period 2 must be outweighed by policy distortions, with a term-limited strong Incumbent recovering the corresponding loss in period 1. Proposition 4.5 reflects this reasoning.

This finding suggests that term limit pledges serve as an instrument for candidates to signal to the Voter that they prioritize policymaking over their long-term political ambitions. By taking this pledge, candidates signal that they are more concerned with enacting the optimal policy in their first and only term than securing future terms compared to their opponents. In turn, the Voter grants them an electoral advantage over reelection-seeking candidates. While this arises endogenously in my model, it echoes the common belief that "[r]eelection-seeking behavior by politicians is [...] regarded with disdain and contempt" by the electorate (Fearon, 1999, p. 60).

#### When Do Self-Imposed Term Limits Improve Voter Welfare?

I now turn to the welfare implications of self-imposed term limits, aiming to answer the following question: Under what circumstances can they enhance voter welfare?

In equilibria where candidates pledge to term limits with positive probability, the Voter must regard a candidate who pledged to term limits as equally favorable to one who has not. The reason is that according to Proposition 4.1, the Voter must set their election rule to compensate candidates who forgo reelection. Therefore, the Voter's payoffs equal the payoffs from electing a candidate of expected strength  $\hat{k}$  who has not pledged to term limits. To assess whether self-imposed term limits improve voter welfare, the payoffs from electing a candidate of expected strength  $\hat{k}$  must be compared to the payoffs from electing a candidate randomly drawn from the pool of first-period candidates, both of whom seek reelection.

In general, self-imposed term limits affect voter welfare through two mechanisms:

- (i) *Strength:* A candidate who has not pledged to term limits has a different expected strength from a candidate randomly selected from the pool of first-period candidates.
- (ii) *Behavior:* In the presence of career concerns, the Incumbent's policy decisions vary as a function of her expected strength, which is different from that of a candidate randomly selected from the pool of first-period candidates.

Proposition 4.6 states that for term limit pledges to improve voter welfare, they must pull the Incumbent's behavior in the presence of career concerns closer to what is optimal from the Voter's perspective, holding expected strength fixed.

**Proposition 4.6.** In equilibria where strong candidates pledge to term limits with a strictly positive probability, partial separation improves voter welfare only through the Incumbent's policy decisions, implying that for term limits pledges to be welfare-improving, we must have:

$$\hat{\kappa} E_{\sigma_s(\hat{\kappa})} \left[ u_v \right] + (1 - \hat{\kappa}) E_{\sigma_w(\hat{\kappa})} \left[ u_v \right] > \hat{\kappa} E_{\sigma_s(\kappa)} \left[ u_v \right] + (1 - \hat{\kappa}) E_{\sigma_w(\kappa)} \left[ u_v \right].$$

In equilibria where strong politicians pledge to term limits, the effect of the strength mechanism on voter welfare is necessarily detrimental since reelection-seeking candidates' expected strength is lower than first-period candidates' expected ability.<sup>4</sup> Accordingly, self-imposed term limits improve voter welfare only if the behavioral mechanism has a sufficiently large positive effect on voter welfare and term limit pledges bring the Incumbent's policy decisions sufficiently closer to the Voter's optimal policies.

This finding implies that the information the Voter elicits at the election stage through term limit pledges is insufficient to improve their welfare compared to the scenario where they randomly select the Incumbent among the first-period candidates. Therefore, considering term limit pledges solely as a signaling device fails to capture their value. Pledges also change the behavior of all politicians: those who take them and those who seek reelection. Proposition 4.6 underscores that the effect of term limit pledges to improve voter welfare. To believe that these pledges will result in better policy decisions, one must embrace a dark perspective on the effect of electoral accountability on policymaking, assuming that it essentially pushes politicians to "slavishly follow[] public whims" at the expense of "their constituents' best

<sup>&</sup>lt;sup>4</sup>The opposite is true in equilibria where weak politicians pledge to term limits.

interests" (Cain & Levin, 1999, p. 170). From this standpoint, electoral accountability fosters careerism, weakening the effectiveness of officeholders who would otherwise govern responsibly.

# Application to Electoral Competition Between Congruent and Non-Congruent Politicians

Above, I analyzed term limit pledges at the highest level of generality. This analysis did not depend on the specification of players' preferences and the quality of politicians' policy-relevant private information. Now, I focus on a specification of my theoretical framework where candidates differ in their policy preferences. I show that, under plausible conditions, self-imposed term limits can be informative and improve voter welfare.

In equilibrium, the Voter always prefers a candidate with a positive probability of being strong to a candidate known to be weak, even if the former distorts her policy decisions in period 1. Accordingly, according to Proposition 4.4, only strong candidates can pledge to term limits.

In equilibria where strong candidates pledge to term limits, the Voter must be indifferent between electing a candidate who has made such a pledge and one who has not. Consequently, term limit pledges can only occur if there is a value  $\hat{\kappa} \in (0, 1)$  that makes the Voter indifferent between a strong term-limited candidate and a reelection-seeking candidate with expected strength  $\hat{\kappa}$ . In turn, the probability that strong candidates pledge to term limits must be such that the posterior likelihood of a reelection-seeking candidate being strong equals  $\hat{\kappa}$ :

$$\mathbb{P}\left(\theta_{j} = s \mid \text{Candidate pledges to term limits}\right) := \frac{\kappa \left(1 - \sigma_{s}^{\circ}\right)}{\kappa \left(1 - \sigma_{s}^{\circ}\right) + 1 - \kappa} = \hat{\kappa}$$
$$\Leftrightarrow \sigma_{s}^{\circ} = \frac{\kappa - \hat{\kappa}}{\kappa \left(1 - \hat{\kappa}\right)}$$

The equation above shows that term limit pledges can be informative in equilibrium only if the Incumbent's expected strength  $\kappa$  exceeds  $\hat{\kappa}$ . Moreover, there must be a value  $\nu^{\circ} \in [1/2, 1]$  that adequately compensates strong candidates for the cost of forgoing reelection, which in turn requires a sufficiently high  $\kappa$ . From this point onward, I focus on verifying the existence of a value  $\hat{\kappa}$  that makes the Voter indifferent between a candidate who has pledged to term limits and one who has not, under the understanding that, in equilibrium, self-imposed term limits can occur if and only



if: (i)  $\kappa$  is strictly greater than  $\hat{\kappa}$ , and (ii)  $\kappa$  is sufficiently high for a suitable value  $\nu^{\circ}$  to exist.

Incumbent's Expected Strength  $\kappa$ 

Figure 4.1: Voter Welfare as a Function of the Incumbent's Expected Strength

For term limit pledges to be simultaneously informative and improve voter welfare, non-monotonicity of welfare with respect to the Incumbent's expected strength is required. I show the logic behind this proposition graphically. Figure 4.1 illustrates voter welfare as a function of the Incumbent's expected strength. In partially separating equilibria, the posterior probability that the Incumbent is strong if she seeks reelection must correspond to the *x*-coordinate of an intersection point between:

- (i) The horizontal line representing voter welfare from electing a candidate known to be strong who has pledged to term limits.
- (ii) The thick curve or one of the dashed and dotted lines, representing voter welfare from electing a candidate with expected strength  $\kappa$  who seeks reelection.

Term limit pledges are informative in equilibrium only if  $\kappa$  is strictly greater than one of the intersection points' *x*-coordinate. Furthermore, they improve voter welfare

if its value at  $\kappa$  is below the horizontal line. If voter welfare is monotonic, these two conditions can hold simultaneously only if voter welfare decreases with the Incumbent's expected strength, which is impossible in equilibrium. On the other hand, both conditions can be satisfied if voter welfare is non-monotonic. This result echoes Kartik and Van Weelden (2019)'s findings about the necessity of the non-monotonicity of voter welfare for informative cheap talk in elections, further stressing its connection with term limit pledges.

In this section, I consider whether term limit pledges can be simultaneously informative and improve voter welfare in three categories of equilibria: truthful, pooling, and responsive equilibria.

#### **Truthful Equilibria**

First, I consider truthful equilibria where the Incumbent enacts her myopically optimal policy in the presence of career concerns. It is sequentially rational for the Incumbent to behave truthfully if and only if the difference in reelection probabilities between both policies is small enough. This is the case specifically when  $\hat{\kappa}$  differs sufficiently from 1/2. Under these conditions, the weight of the Incumbent's decisions in the Voter's posterior beliefs is the lowest, resulting in a small variation in reelection probabilities upon enacting each policy.

There is a unique value of  $\hat{\kappa} \in (0, 1)$  for which the Voter is indifferent between electing a candidate who pledged to term limits and one who has not. If the Incumbent finds it optimal to behave truthfully even in the presence of career concerns when her expected strength is  $\hat{\kappa}$ , then self-imposed term limits can occur in equilibrium for all values of  $\kappa$  greater than  $\hat{\kappa}$ .

Unfortunately, in cases where a truthful equilibrium exists, self-imposed term limits invariably reduce voter welfare. The reason is that voter welfare is monotonic and strictly increasing with the Incumbent's expected strength.<sup>5</sup> This result is consistent with Proposition 4.6: term limit pledges can improve voter welfare only through the behavioral channel, and the Incumbent's behavior is the same across all truthful equilibria.

<sup>&</sup>lt;sup>5</sup>Multiple equilibria may arise when the Incumbent's expected strength is  $\kappa$ . My conclusions on the welfare implications of term limit pledges rely on a simple equilibrium selection principle: if the Incumbent follows a truthful equilibrium at  $\hat{\kappa}$  and such an equilibrium exists for  $\kappa > \hat{\kappa}$ , she also follows a truthful equilibrium at  $\kappa$ .

#### **Pooling Equilibria**

Next, I consider whether term limit pledges can arise in pooling equilibria where, in the presence of career concerns, the Incumbent adopts the same policy irrespective of her type and the signal she observes.

Self-imposed term limits cannot arise in pooling equilibria. For term limit pledges to occur, Proposition 4.5 suggests that the Incumbent must enact the policy that imposes the highest cost for strong politicians. Equation (4.5) holds only if the policy on which the Incumbent pools her policy decisions yields lower payoffs for strong politicians. Assuming this is the case, the D1 Criterion implies that the Voter must assign a probability of one to the Incumbent being strong upon observing that she deviated. Consequently, the Incumbent would secure reelection with certainty by deviating. However, this contradicts the premise that it is optimal for the Incumbent to enact the same policy regardless of her type or the signal she observes.

#### **Responsive Equilibria**

Finally, I consider whether self-imposed term limits can arise and improve voter welfare in responsive equilibria where the Incumbent distorts her policy decisions but remains somewhat responsive to the signal she observes. I consider two cases:

- (i) Equilibria where the Incumbent distorts her policy decisions when she is both weak and strong.
- (ii) Equilibria where the Incumbent distorts her policy decisions only when she is strong.

In the first scenario, voter welfare increases monotonically with the Incumbent's expected strength conditional on seeking reelection. It follows that self-imposed term limits cannot improve voter welfare if both types distort their policy decisions in equilibrium.

In the second scenario, the following result outlines the scope and welfare implications of self-imposed term limits at the election stage:

**Proposition 4.7.** In equilibria where the Incumbent distorts her policy decisions in the presence of career concerns if and only if she is strong, there exists some  $\underline{\delta} > 0$  and function  $\underline{\kappa} : \mathbb{R}_+ \to (0, 1)$ , which take as an input the notional discount factor

 $\delta$ , such that self-imposed term limits occur in equilibrium if and only if  $\delta \geq \underline{\delta}$  and  $\kappa > \underline{\kappa}(\delta)$ .

Also, there is some  $\bar{\kappa}(\delta) \in (0, 1)$ , with  $\bar{\kappa}(\delta) \geq \underline{\kappa}(\delta)$ , such that self-imposed term limits improve voter welfare if and only if the Incumbent distorts her decisions toward policy  $b, \pi > \bar{\pi}$ , and  $\kappa > \bar{\kappa}(\delta)$ .

Finally,  $\kappa$  (resp.,  $\bar{\kappa}$ ) is decreasing (resp., increasing) with  $\delta$ .

Strong politicians can distort their decisions toward either policy a or policy b. An equilibrium in which strong politicians distort their actions toward policy a (resp., policy b) in the presence of career concerns exists only if:

$$\pi^{s=a} - \bar{\pi} > (\text{resp.}, <) \bar{\pi} - \pi^{s=b}$$

This condition implies that strong politicians must distort their policy decisions in the direction of the policy toward which it is more costly for weak politicians to distort their decisions. Upon doing so, weak politicians continue to behave truthfully, that is, according to their signal about the state of the world.

Figure 4.2 illustrates voter welfare as a function of the Incumbent's expected strength for different values of the notional discount factor. Voter welfare has a bell-shaped curve. It rises for low values of  $\hat{k}$  and falls for high values. This shape arises because the Incumbent engages in larger distortions as her expected strength deviates from 1/2. As uncertainty about her strength decreases, the Voter places less weight on the Incumbent's policy decisions in their posterior beliefs. Consequently, the Incumbent must engage in greater distortions to signal the same level of strength. For  $\hat{k}$  values below 1/2, increasing  $\hat{k}$  lessens the Incumbent's incentives to distort her policy decisions while simultaneously making her stronger in expectation. Both effects improve voter welfare. However, when  $\hat{k}$  exceeds 1/2, increasing  $\hat{k}$  boosts the Incumbent's incentives to distort her decisions. Eventually, this negative effect surpasses the benefits from a stronger incumbent in expectation, resulting in a decline in voter welfare.

For all values of the Incumbent's expected strength, voter welfare increases with the notional discount factor  $\delta$ . A higher  $\delta$  indicates that the Incumbent places a greater weight on career considerations. Therefore, she expects a lower difference between reelection probabilities from enacting both policies in equilibrium, resulting in fewer policy distortions. Accordingly, Proposition 4.7 states that partial separation can



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Incumbent's Expected Strength  $\kappa$ 

Figure 4.2: Voter Welfare as a Function of the Incumbent's Expected Strength for Different Values of the Notional Discount Factor

only occur when the Incumbent's career concerns are sufficiently strong; otherwise, no value of  $\hat{\kappa}$  makes the Voter indifferent between electing a term-limited candidate and one eligible for reelection, as for the solid line in Figure 4.2. For self-imposed term limits to arise, first-period candidates' expected strength  $\kappa$  must exceed  $\hat{\kappa}$ .

Self-imposed term limits improve voter welfare only if the value of  $\hat{k}$  approaching one results in lower payoffs than electing a strong candidate committed to term limits. This condition holds only if the Incumbent distorts her decisions toward the ex-ante suboptimal policy. Indeed, whenever strong politicians distort their decisions toward policy *a*, this policy must also be the Voter's preferred policy.<sup>6</sup> In this case, term limit pledges cannot improve voter welfare. On the other hand, term limit pledges can improve voter welfare when strong politicians distort their decisions toward policy *b* because such an equilibrium can arise even when policy *a* is the Voter's ex-ante optimal policy. For term limit pledges to be beneficial,

<sup>&</sup>lt;sup>6</sup>This follows from the condition that such an equilibrium exists only if  $\pi^{s=a} - \bar{\pi} > \bar{\pi} - \pi^{s=b}$ . Since  $\pi > 1/2$ , it necessarily implies that  $\pi^{s=a} - \pi < \pi - \pi^{s=b}$ , which in turn requires that  $\pi > \bar{\pi}$ .

first-period candidates' expected strength  $\kappa$  must also be sufficiently high so that the cost of the Incumbent's policy distortions outweighs the benefits.

#### 4.5 Discussion and Conclusion

In this article, I demonstrate how self-imposed term limits arise endogenously within a standard model of electoral accountability.

The first contribution of my analysis is to show that term limit pledges can endogenously arise in environments where communication is costless and non-binding, revealing a strong connection between self-imposed term limits and informative cheap talk in elections. In equilibria with informative cheap talk, some weak candidates reveal their type to the Voter, resulting in their automatic non-reelection. These candidates effectively pledge to term limits. This finding is remarkable as it implies that self-imposed term limits are not merely theoretical constructs but arise organically in models of election campaigns with strategic information transmission. Other equilibria exist wherein strong candidates voluntarily pledge to term limits, provided they have credible commitment power. These equilibria hold under a broader range of conditions (Propositions 4.3 and 4.4).

Self-imposed term limits allow candidates to signal their type to the Voter. By taking a term limit pledge, candidates demonstrate to the Voter that they prioritize policymaking and enacting optimal policies during their unique term in office, even at the cost of abandoning their long-term political ambitions (Proposition 4.5). This pledge grants them an electoral advantage over reelection-seeking candidates (Proposition 4.1). While this preference arises endogenously in my model, it echoes the widespread belief that voters tend to disapprove of politicians overly concerned with their reelection.

Self-imposed term limits convey information about a candidate's type, helping the Voter make better choices when electing politicians. However, this information alone does not outweigh the cost of electing a candidate who will be ineligible for reelection. Instead, the primary appeal of candidates who pledge to term limits lies in their independence from career concerns, allowing them to make policy decisions free from electoral pressures. By altering their reputation relative to the Challenger, term limit pledges also affect the policy decisions of candidates who do not make them and face career concerns. I show that to improve voter welfare, self-imposed term limits must alter the Incumbent's behavior in the presence of career concerns and, specifically, bring it into line with the Voter's preferences (Proposition 4.6).

Although politicians may generally differ along a range of traits, I characterize the equilibria of a model specification wherein politicians differ specifically in their policy preferences. In this setup, self-imposed term limits can arise under a broad set of parameters. I demonstrate that in equilibria where the Incumbent distorts her decisions toward the ex-ante suboptimal policy if and only if she is strong, term limit pledges can simultaneously be informative and improve voter welfare (Proposition 4.7). This finding underscores plausible circumstances under which term limit pledges can be informative and improve voter welfare.

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## SUPPLEMENTARY MATERIAL FOR CHAPTER 1

### A.1 Choice and Validation of the Number of Topics



**Diagnostic Values by Number of Topics** 

Figure A.1: Diagnostic Values by Number of Topics



Figure A.2: Correlation Between Held-Out Likelihood and Semantic Coherence

COVID-19/Health Care	health, vaccin, care, manag, crisi, pandem, suppli, drug, deliv, territori, transfer, medic, provinc, emerg, addit, system, product, failur, receiv, quickli			
National Defense/Veterans Affairs	veteran, affair, militari, forc, defenc, servic, mission, arm, afghanistan, serv, foreign, honour, war, centr, equip, staff, oper, maintain, deserv, nation			
Budget/Taxes	tax, cost, pai, carbon, busi, credit, taxpay, corpor, increas, save, rais, consum, deficit, revenu, bank, financ, billion, budget, balanc, price			
Democratic Institu- tions/Investigations/RCMP	elect, senat, committe, court, answer, appoint, polic, campaign, question, rcmp, leader, alleg, justic, legal, common stori, expens, simpl, parliament, debat			
Foreign Policy/Immigration/Refugees	secur, world, border, intern, immigr, refuge, unit, agenc, china, food, concern, threat, organ, situat, alli, countri, citizen, human, engag, american			
Criminal Justice/Culture/Official Languages/Human Rights	offici, women, colleagu, bill, legisl, languag, protect, right, victim, proud, introduc, posit, act, statu, discuss, issu, equal, cultur, commit, human			
Economic Growth/Industry/Job Creation	creat, econom, job, sector, economi, growth, industri, lost, manufactur, opportun, creation, grow, innov, market, region, focus, export, plan, thousand, busi			
Auditor General/Public Procurement/Treasury Board	board, farmer, contract, report, public, presid, decis, truth, auditor, releas, review, agricultur, transpar, media, treasuri, inform, depart, independ, fire, hide			
Climate Change/Environment	chang, climat, environ, emiss, fight, target, clean, reduc, action, greenhous, plan, real, oil, pollut, effect, energi, approach, solut, price, reduct			
Employment/Labor	worker, employ, wait, employe, insur, labour, lose, pension, union, fix, leav, peopl, week, paid, extend, program, disabl, post, train, month			
Education/Research/Youth	fund, million, program, student, research, cut, school, budget, dollar, strategi, billion, educ, invest, aborigin, hundr, scienc, summer, announc, monei, init			
Intergovernmental Affairs	agreement, deal, negoti, feder, british, provinc, provinci, sign, trade, premier, quebec, columbia, free, ontario, respect, jurisdict, met, regul, oppos, reach			
Families/Middle Class/Seniors	famili, child, vote, children, middl, class, senior, poverti, benefit, help, choic, invest, lower, middleclass, hard, singl, rate, join, incom, live			
Natural Resources/Infrastructure	consult, indigen, project, commun, coast, transport, resourc, infrastructur, pipelin, northern, municip, safeti, build, water, assess, move, nation, citi, natur, toronto			
Ethics	commission, rule, ethic, person, law, conflict, matter, trust, recommend, friend, follow, polit, respons, advic, financ, investig, accept, break, violat, account			

Table A.1: Words Representative of the Estimated Topics

# Table A.2: Documents from the "Climate Change/Environment" Topic

1	Mr. Speaker, I agree with the Government of Québec's declaration. However, the measures in Québec's plan will not reduce air pollution enough. We need a strict national regulatory framework that goes beyond Kyoto targets. The clean air act will enable us, for the first time, to implement integrated regulation of air pollution and greenhouse gases.
2	Mr. Speaker, climate change is real and the cost of inaction is enormous. It is disappointing that while climate change is having a real impact on the health and well-being of Canadians, the Conservatives still do not have a plan to protect our environment. If they do not have a plan on climate change, they do not have a plan for the economy or for the future. Can the Parliamentary Secretary to the Minister of Environment please advise this House of the actions our government is taking to fight climate change?
3	Mr. Speaker, the targets for the economy are clear. According to our plans, greenhouse gas emissions must be reduced by 20% by 2020. In the meantime, in the regulatory system proposed and detailed by the Minister of the Environment, it is clear that we are calling for efforts to be made in terms of carbon sequestration, specifically for the oil sands. These are special measures for that sector to help us achieve our results.
4	Mr. Speaker, I agree that those who are trying to sabotage the plan to deal with greenhouse gases should be condemned. It is the Bloc members and the Liberals who should be condemned. This party is a party of action. We have tabled the clean air act and those parties want to stop Canada from moving forward on reducing greenhouse gas emissions. They need to stop their sabotage. They need to get on side with reducing greenhouse gas emissions.
5	Mr. Speaker, the vast majority of Canadians want a real plan to reduce greenhouse gas emissions, not a con job. Canada can and should be a leader on this issue. We should be about renewable energy, about eliminating subsidies that reward pollution, about pushing for energy efficiency, about being leaders in green technology. The government's plan does just the opposite, and no one believes Conservatives take climate change seriously. As the world heads to the Cancun climate conference, will the government be a laughing stock, once again?
6	Mr. Speaker, our government is committed to working with our international partners to address climate change. We have contributed \$1.2 billion to developing countries so that they can reduce emissions and adapt to changes. We are also a founding member of an international coalition taking action to reduce pollutants like black carbon. I look forward to meeting with my international counterparts to continue to take action in addressing climate change.
7	Mr. Speaker, there is no question that the world must take action. Here in Canada, we are showing true leadership with our plan for absolute targets to reduce greenhouse gas emissions by 20% by 2020. Perhaps the NDP leader should read today's La Presse. André Pratte wrote that the Prime Minister's attitude is "perfectly reasonable." He said that the Prime Minister "is right: everyone, including the United States, has to sign on to the post-Kyoto strategy." We are taking action.
8	Mr. Speaker, I have good news for the member for Skeena–Bulkley Valley. The Conservative government finally has begun to get rid of the tax subsidies given to the oil sands by our friends opposite in the Liberal Party. We are taking real action to reduce greenhouse gas emissions by an absolute 20%. That will put Canada in a leadership position. We will do more in the next 12 years than virtually any country in the world. While we may not have the full support and enthusiasm of the member for Skeena–Bulkley Valley, we have the full support of the Liberal Party of Canada.
9	Mr. Speaker, I think the Prime Minister himself does not believe his own distortions. He knows very well that in June 2005 the prime minister at the time came forward with a plan for greenhouse gas reductions seven times more than what he wants. He knows very well that a full year was wasted when he killed the plan and the billions of dollars in greenhouse gas reductions. There are a lot of programs that he really just took parts of, and in changing the names, he is trying to fool the Canadian people. Will he show this kind of awful behavior at the G-8 meeting? Will he try to fool the world after he tried to fool Canadians?
10	Mr. Speaker, we are playing a leadership role on the international stage. We have helped more than 65 developing countries to reduce emissions and adapt to climate change. We are doing our part by contributing to the Green Climate Fund. We are a founding member and major financial contributor to the Climate and Clean Air Coalition. We are also addressing short-lived climate pollutants under the chairmanship of the Arctic Council. We will continue to protect our environment while keeping our economy strong.

#### A.2 Estimation of Substitution Effects

In our previous analysis, we investigated how variations in the public salience of climate change influenced the level of attention given by political parties to this issue during the Question Period. Now, we shift our focus towards understanding the effect of changes in the public salience of climate change on the attention political parties dedicate to other policy matters during their Question Period interventions. This analysis serves as a placebo test, allowing us to assess whether our quasi-experimental treatment influences an outcome that is different from our outcome of interest. In general, we do not anticipate a significant or consistent effect of the public salience of climate change on the proportion of Question Period interventions related to other policy issues. Nonetheless, these findings could provide insights into some of the strategies employed by political parties to redirect attention towards more favorable topics when climate change gains greater prominence.

Formally, our aim is to estimate the parameter  $\beta_i^j$  in the following regression model:

$$\log\left(\frac{Y_{it}^{j}}{1 - Y_{it} - Y_{it}^{j}}\right) = \alpha_{i}^{j} + \beta_{i}^{j}\log\left(X_{t}\right) + \varepsilon_{it}^{j}.$$
(A.1)

In this equation,  $Y_{it}^{j}$  represents the proportion of Question Period interventions made by party *i* on topic *j* during week *t*. The dependent variable is standardized, enabling us to measure the prominence of a specific topic relative to all other topics except climate change. Furthermore, this standardization accounts for fluctuations in the proportion of interventions related to climate change, allowing us to analyze the effect of changes in the public salience of climate change on the topic composition of interventions across all other topics.

Figure A.3 presents the results from estimating Equation (A.1) using the two-stage least squares method. The figure displays the point estimates on the *x*-axis along with their corresponding 95% confidence intervals. For reference, the final row of the figure shows the results from estimating Equation (1.1) and includes their respective 95% confidence intervals. A positive coefficient implies that a party is more likely to highlight a specific topic in their Question Period interventions when there are exogenous changes in the public salience of climate change. Conversely, a negative coefficient suggests that the party is less likely to address that topic in their interventions when there are exogenous shifts in the public salience of climate change.

In general, our analysis does not reveal a consistent or systematic effect of the public salience of climate change on the topics discussed during the Question Period. However, the results do suggest that both the Conservative and Liberal parties have engaged in certain strategies of obfuscation and strategic maneuvering, albeit to a limited extent. Specifically, when the public salience of climate change increases, the Conservative Party noticeably amplifies its discussions on topics such as economic growth, job creation, and intergovernmental affairs in their Question Period interventions. On the other hand, the Liberal Party reduces its emphasis on infrastructure and natural resources within Question Period interventions in response to a surge in the public salience of climate change. Finally, our findings suggest that following shifts in the public salience of climate change, the Liberal Party places greater emphasis on national defense while diminishing the prominence of foreign policy in their Question Period interventions.

#### A.3 Geographic Heterogeneity in Issue Responsiveness

In our previous analysis, we have focused on how political parties respond to the national public salience of climate change. This choice was based on the premise that parties should reflect the concerns of the general public. However, we acknowledge that the public is not a homogeneous entity, and different groups can exert varying levels of influence on the decision-making processes of political parties. In support of this notion, Penner et al. (2006) argue that political representation during the Question Period is "particularized," meaning that parties tend to represent the interests of specific sub-populations.

In general, the opinions and preferences of a party's supporters are likely to carry more weight in shaping its decision-making. These supporters may be concentrated in specific regions of the country. Additionally, members of a party's caucus represent geographic areas known as ridings and may face pressure to address the unique concerns and interests of their constituents. Consequently, we posit that parties may exhibit varying degrees of responsiveness to changes in the public salience of climate change across different provinces.

We acknowledge that our previous analysis, which relied on a national measure of public salience, might not adequately capture regional variations in the salience of climate change. Given Canada's vast size and geographical diversity, the impacts of climate change can be experienced differently and at different times across various regions. Consequently, there may exist significant regional disparities in the degree



Figure A.3: Substitution Effects Estimates

of salience attributed to climate change. To account for these regional disparities, we incorporated into our analysis measures of the provincial public salience of climate change obtained from Google Trends.

The relationship between the public salience of climate change in Canada and its ten provinces is depicted in Figure A.4. The vertical axis represents the national public salience of climate change, while the horizontal axis represents the public salience of climate change in each province. Our analysis reveals a positive correlation between the public salience of climate change at the provincial and national levels. The strength of this correlation is primarily influenced by the size of each province, with larger provinces exhibiting a higher correlation between their public salience of climate change and the national level.

Next, we conduct an analysis to evaluate the extent to which political parties seem to prioritize certain constituencies over others. Specifically, we employ a regression model that takes into account the levels of public salience regarding climate change at both the national and provincial levels.

Estimating issue responsiveness poses a significant challenge due to simultaneous causality. The public's perception of priorities is not only influenced by political parties' attention to policy issues but also has an impact on the level of attention parties allocate to those issues. For instance, supporters of the Conservative Party may not prioritize climate change because the party itself does not address it. Conversely, the Conservative Party may not focus on climate change because its supporters do not consider it a crucial issue. To address these challenges, we have previously developed a research approach that allows us to causally identify parties' responsiveness to the national public salience of climate change. However, this methodology does not allow us to causally identify parties' responsiveness to specific sub-populations. Therefore, our analysis primarily focuses on examining whether there is a residual correlation between the prevalence of climate change discussions in Question Period and its public salience at the provincial level.

The estimation results are presented in Tables A.3 and A.4. The available evidence suggests that there is limited support for the notion that parties respond differently to the public salience of climate change across provinces. When accounting for the national public salience of climate change, we observed no significant residual relationship between the public's level of concern about climate change in the provinces and the frequency of climate change discussions in Question Period, except in a few specific cases. Before 2015, both the Conservatives and Liberals

in Alberta displayed a negative residual correlation. This indicates that, holding all other factors constant, these parties addressed climate change less frequently in their Question Period interventions when the issue was more prominent in the province. Similarly, negative residual correlations were observed for the Liberals in New Brunswick prior to 2015, as well as for the Liberals in Manitoba and Nova Scotia after 2015. However, it is crucial to note that these residual correlations are of minor magnitude and could be considered "false positives." Therefore, overall, the findings suggest little substantial evidence to support the notion that parties exhibit differential responsiveness to the public salience of climate change across provinces.



Figure A.4: Correlation Between National and Provincial Levels of the Public Salience of Climate Change

	СРС		LPC		NDP	
	(1)	(2)	(3)	(4)	(5)	(6)
National	0.400*** (0.048)	0.498*** (0.145)	0.282*** (0.062)	0.062 (0.187)	0.355*** (0.056)	0.454** (0.189)
Alberta		-0.014*** (0.005)		-0.012** (0.006)		-0.006 (0.007)
British Columbia		0.059 (0.062)		0.156* (0.080)		0.117 (0.086)
Manitoba		-0.001 (0.002)		-0.001 (0.002)		0.001 (0.002)
New Brunswick		-0.001 (0.001)		-0.004*** (0.001)		-0.0004 (0.002)
Newfoundland and Labrador		-0.002 (0.001)		0.001 (0.001)		-0.001 (0.002)
Nova Scotia		0.001 (0.002)		-0.001 (0.002)		0.001 (0.002)
Ontario		-0.153 (0.125)		0.105 (0.161)		-0.241 (0.167)
Prince Edward Island		-0.001 (0.001)		-0.0001 (0.001)		0.0004 (0.002)
Québec		-0.001 (0.004)		0.001 (0.006)		-0.006 (0.006)
Saskatchewan		0.001 (0.001)		0.004** (0.002)		0.001 (0.002)

Table A.3: Regional Heterogeneity in Issue Responsiveness

Note:

 $p^* < 0.1; p^* < 0.05; p^* < 0.01$ 

	СРС		L	РС
	(1)	(2)	(3)	(4)
Before 2015				
National	0.428***	0.376**	0.319***	0.128
	(0.050)	(0.177)	(0.066)	(0.239)
Alberta		-0.014***		-0.015**
		(0.005)		(0.007)
British Columbia		0.072		0.125
		(0.075)		(0.102)
Manitoba		-0.001		-0.0003
Name Dana and als		(0.002)		(0.003)
New Brunswick		-0.0001		-0.003
Newfoundland and Labrador		(0.001)		(0.002)
		(0.002)		(0.001)
Nova Scotia		0.001		(0.002)
		(0.001)		(0.0002)
Ontario		-0.012		0.109
		(0.153)		(0.207)
Prince Edward Island		-0.001		0.001
		(0.001)		(0.002)
Québec		-0.001		-0.001
		(0.005)		(0.006)
Saskatchewan		0.001		0.003
		(0.002)		(0.002)
After 2015				
National	0.127	-0.370	0.229*	0.560
	(0.101)	(0.445)	(0.121)	(0.437)
Alberta		0.025		0.190*
		(0.099)		(0.096)
British Columbia		0.164		-0.004
		(0.131)		(0.129)
Manitoba		0.0003		$-0.009^{**}$
		(0.004)		(0.003)
New Brunswick		-0.002		$-0.005^{**}$
		(0.002)		(0.002)
Newfoundland and Labrador		-0.001		0.001
		(0.002)		(0.002)
Nova Scotia		0.004		$-0.008^{**}$
		(0.003)		(0.003)
Ontario		0.168		-0.266
		(0.283)		(0.279)
Prince Edward Island		-0.0003		-0.002
Outhoo		(0.002)		(0.002)
Quebec		0.095		-0.124
Saskatchewan		(0.080)		(0.080)
Jaskauntwan		(0.004)		(0.002)
		(0.005)		(0.000)
Note:		*p < 0.1:	** <i>p</i> < 0.05;	$p^{***} p < 0.01$

Table A.4: Regional Heterogeneity in Issue Responsiveness Before and After the2015 Federal Election

 $p^* < 0.1; p^* < 0.05; p^*$ 

# SUPPLEMENTARY MATERIAL FOR CHAPTER 2

# **B.1** Additional Figures and Tables

Model	multi-qa-mpnet-base-cos-v1		
Loss Function	Multiple Negatives Ranking Loss		
Epochs	10		
Batch Size	8		
Optimizer	$\operatorname{Adam}W^{\dagger}$		
Learning Rate	$2 \times 10^{-5\dagger}$		
Learning Rate Scheduler	Warm-up Linear <sup>†</sup>		
Warm-up Steps	$10,\!000^\dagger$		
Weight Decay	$0.01^{\dagger}$		
Maximum Gradient Norm	1 <sup>†</sup>		
	<sup>†</sup> Default Value		

Table B.1: Training Hyperparameters



Figure B.1: Mean Reciprocal Rank on the Validation Set by Batch Size and Epoch

Count	54,914
Mean	0.5387
<b>Standard Deviation</b>	0.1865
Minimum	-0.1625
<b>First Quartile</b>	0.4178
Median	0.5608
Third Quartile	0.6806
Maximum	0.9542

Table B.2: Descriptive Statistics of the Distribution of the Cosine Similarity Between Questions and Answers

Table B.3: Mean Reciprocal Rank on the Inference Set

Model Variant	Pre-Trained	Fine-Tuned	Fine-Tuned ("Reverse" Objective)	
Question	0.1157	0.1260	0.1276	
Answer	0.1040	0.1292	0.1281	

*Note:* The first row shows how well model variants rank the possible questions for each answer, while the second row shows how well model variants rank the possible answers for each question.

Table B.4: Performance of the Fine-Tuned Model on the Inference Set

	@ 10	@ 25	@ 100
Precision	0.0261	0.0147	0.0056
Recall	0.2607	0.3674	0.5607
F-1 Score	0.0237	0.0141	0.0056

*Note:* Each column presents the performance metrics for some threshold, with all answers ranked above that threshold being predicted as correct. For example, the first column shows our model's precision, recall, and F-1 score when, for each question, the top 10 answers (ranked by their cosine similarity to the question's embedding) are predicted as correct. In this scenario, 2.56% of predictions are accurate, and 25.61% of correct answers are captured by these predictions.



Figure B.2: Comparison of Cosine Similarity Estimates Between Fine-Tuned Models with Main and Reverse Objectives



Figure B.3: Probability of the Correct Answer Being the Closest to the Question by Cosine Similarity Between Questions and Answers and Party



Figure B.4: Probability of the Correct Question Being the Closest to the Answer by Cosine Similarity Between Questions and Answers and Party



Figure B.5: Rank of the Correct Answer by Cosine Similarity Between Questions and Answers and Party


Figure B.6: Rank of the Correct Question by Cosine Similarity Between Questions and Answers and Party



Figure B.7: Probability of the Correct Answer Being the Closest to the Question by Cosine Similarity Between Questions and Answers and Legislature



Figure B.8: Probability of the Correct Question Being the Closest to the Answer by Cosine Similarity Between Questions and Answers and Legislature



Figure B.9: Rank of the Correct Answer by Cosine Similarity Between Questions and Answers and Legislature



Figure B.10: Rank of the Correct Question by Cosine Similarity Between Questions and Answers and Legislature

Category	Average Cosine Similarity	Count
Non-Replies	0.4327	189
Intermediate Replies	0.5454	194
Full Replies	0.6268	117

Table B.5: Validity Experiment Results



Figure B.11: Distribution of the Cosine Similarity Between Questions and Answers by Reply Category



Figure B.12: Distribution of the Cosine Similarity Between Questions and Answers by Reply Category



Notes:

- 1. This figure includes only opposition parties.
- 2. The seat count reflects each party's representation at the start of the legislature.
- 3. The correlation coefficient and corresponding p-value are shown in the top right corner.

Figure B.13: Average Cosine Similarity Between Questions and Answers by Seat Count



Notes:

- 1. This figure includes only opposition parties.
- 2. The seat share reflects each party's representation at the start of the legislature.
- 3. The correlation coefficient and corresponding p-value are shown in the top right corner.

Figure B.14: Average Cosine Similarity Between Questions and Answers by Seat Share



Figure B.15: Monthly Evolution of the Average Cosine Similarity Between Questions and Answers by Party

## **B.2** Transcript Collection Process

We developed our dataset with the official English transcripts published online by the Clerk of the House of Commons, which include professional translations of the interventions initially pronounced in French. The raw transcripts do not connect questions to their answers and vice-versa. To resolve this issue, we categorized all interventions from Cabinet ministers and parliamentary secretaries as answers. We then matched each answer with the immediately preceding intervention by an MP who is neither a Cabinet minister nor a parliamentary secretary nor the Speaker. We filtered out the resulting exchanges containing a question or answer with a length below the 2.5<sup>th</sup> percentile or above the 97.5<sup>th</sup> percentile to remove interventions with an unintelligible text or likely not to have been pronounced during QP but inadvertently included in our dataset.

**B.3** Relationship Between the Topic of Questions and the Quality of Answers In this section, we explore how the quality of answers varies based on the topic of the initial question. We propose two hypotheses:

- (i) Answers to questions about sensitive topics such as personal integrity are, on average, less relevant.
- (ii) Answers to questions about issues over which the government has a better reputation tend to be more relevant.

The first hypothesis relates to sensitive topics that, when scrutinized, can be highly embarrassing and detrimental to one's honor and reputation. In this case, we postulate that government ministers are more likely to prevaricate rather than address allegations directly to avoid fueling the controversy or providing opposition parties with more ammunition. These incentives apply to all government ministers, regardless of their partisan affiliation.

Regarding the second hypothesis, research has long established that parties earn a reputation over time as better stewards of specific policy issues. Parties' perceived expertise, the popularity of their positions, or the issue's relative importance to their supporter base contribute to shaping this reputation (Bélanger & Meguid, 2008; Egan, 2013; Petrocik, 1996). We often refer to this reputation as "ownership" of an issue. In this context, parties will strategically avoid emphasizing issues over which they have a weaker reputation, as doing so would highlight their opponents' strengths and weaken their position. Instead, parties tend to focus on issues they own. One way to achieve this is by supplying more detailed and relevant answers to questions about those issues. Also, issue ownership is likely to be reflected in questions' topics: all else equal, opposition parties will likely ask more questions about issues they own to increase their salience. Accordingly, the government's varying inclination to engage with different topics may contribute to the correlation between a party's ideological proximity to the government and the quality of answers to its questions, as parties ideologically closer to the government may tend to ask more questions on issues more favorable to the government.

To appreciate the relative reputation of Canadian political parties on policy issues, we consider responses to the question "Which party would do the best job at handling each of the following issues?" in the last three editions of the Canadian Election Study (Stephenson et al., 2020, 2022). The policy issues considered in all three

editions are the following: Crime and Justice, Defense, Education, Environment, Healthcare, Immigration and Minorities, and International Diplomacy. Figure B.16 depicts the distribution of responses. The relative status of parties over policy issues varies over time. Nonetheless, between the Conservative Party and the Liberal Party, the former has consistently enjoyed a relatively better reputation for Crime and Justice and Defense. In contrast, the latter has a better reputation for Education, Environment, Healthcare, Immigration and Minorities, and International Diplomacy.

\* \*

To assess variations in answer quality across different question topics, we must have a model for categorizing the latter. There are several available approaches. A simple approach consists of analyzing variations in answer quality across the portfolios of the ministers answering questions. Portfolios group all ministers associated with one or a few government departments. However, we must recognize that the government controls who answers each question. It is one way the government can attempt to deflect or apply a rhetorical frame to the debate. For example, the Minister of the Environment or the Minister of Natural Resources may answer a question on pipeline construction, depending on the angle the government would like to emphasize. These strategic choices can affect our results.

Figure B.17 illustrates the results of this approach, showing the average cosine similarity between questions and answers by party and portfolio of the government member who answered the question. The figure depicts the difference from the overall average cosine similarity for all questions answered by each government to control for systematic variations in the latter.

There are only a few statistically significant differences between the Conservative and Liberal parties in the average cosine similarity between questions and answers conditional on the portfolio of the government member responding. Under the Conservative government, the cosine similarity between questions and answers was higher for the following portfolios: Environment, Government House Leader, National Revenue, and Public Safety and Emergency Preparedness. On the other hand, under the Liberal government, the cosine similarity between questions and



Figure B.16: Reputation of Political Parties Over Policy Issues



Figure B.17: Average Cosine Similarity Between Questions and Answers by Party and Portfolio

answers was higher for the following portfolios: Agriculture and Agri-Food, Employment, Labor and Social Development, Foreign Affairs, Justice, Public Services and Procurement, and Transport, Infrastructure, and Communities.

These differences generally support our hypotheses about the relationship between the quality of answers and the topic of the questions. Given the Conservative Party's strong commitment to public safety and the Liberal Party's to international diplomacy and social policy, we expected ministers and parliamentary secretaries from the corresponding portfolios to deliver, on average, more relevant answers. Other statistically significant differences mirror the parties' stated priorities. The Liberal Party has exhibited a stronger inclination to address questions linked to the Transport, Infrastructure, and Communities portfolio. We expect this, considering the Liberal Party came into power with a high-profile promise to increase public infrastructure investments by \$60 billion over a decade, focusing on affordable housing, green infrastructure, public transit, and rural communities. On the other hand, we did not expect Conservative members of the Environment portfolio to, on average, provide more relevant responses than their Liberal counterparts, given the Liberal Party's strong reputation on environmental issues.

\* \*

Another approach for modeling the topics of questions is to use topic models, which are statistical models used in natural language processing to cluster documents within a corpus sharing similar semantic characteristics. Because the resulting labels are generated solely based on the questions' text, they are not susceptible to government manipulation. To carry out this approach, we use BERTopic, a topic modeling algorithm that leverages sentence embeddings to form dense clusters representing easily interpretable topics (Grootendorst, 2022). We adopt the default parameter values for topic estimation, except for the minimum size, which we set to 50. We generated topic labels with the open-source Llama 2 chat model (Touvron et al., 2023). The prompt used is presented in Table B.6.

Figures B.18 and B.19 depict the average cosine similarity between questions and answers conditional on the initial question's topic, as estimated by BERTopic, for the periods when the Conservative and Liberal parties held office, respectively. Only the 20 subjects with the lowest and the highest average cosine similarity are

System Prompt: You are a helpful, honest, and respectful assistant.

Your task is to label topics clustering questions asked by members of Parliament to Cabinet ministers during the Question Period in the Canadian House of Commons.

You must meticulously follow all the instructions you are given.

**Example Prompt:** I have a topic that contains the following documents:

- Traditional diets in most cultures were primarily plant-based with a little meat on top, but with the rise of industrial-style meat production and factory farming, meat has become a staple food.
- Meat, but especially beef, is the word food in terms of emissions.
- Eating meat doesn't make you a bad person, not eating meat doesn't make you a good one.

The topic is described by the following keywords: meat, beef, eat, eating, emissions, steak, food, health, processed, chicken.

Please devise a short label for this topic. I want this label to reflect the policy issue the questions are about, irrespective of their underlying sentiment.

Please capitalize this label according to standard rules for the capitalization of titles. Make sure to return only the label without additional notes.

Example Output: Environmental Impacts of Meat Consumption

Main Prompt: I have a topic that contains the following documents:

[DOCUMENTS]

The topic is represented by the following keywords: [KEYWORDS].

Please devise a short label for this topic. I want this label to reflect the policy issue the questions are about, irrespective of their underlying sentiment.

Please capitalize this label according to standard rules for the capitalization of titles. Make sure to return only the label without additional notes.

Table B.6: Prompt Used for Generating Topic Labels



Figure B.18: Topics with the 20 Lowest and Highest Average Cosine Similarity Between Questions and Answers for the Conservative Party



Figure B.19: Topics with the 20 Lowest and Highest Average Cosine Similarity Between Questions and Answers for the Liberal Party

displayed. Tables B.7 and B.8 list all topics with their average cosine similarity. For reference, we illustrate the average cosine similarity between questions and answers for the corresponding party with a dashed vertical line in both figures. Besides their implications for the hypothetical relationship between the initial questions' topic and the answers' quality, these figures offer a rich overview of the issues discussed in QP.

There are many parallels in the topics associated with the least relevant answers for both the Conservative and Liberal parties. In particular, there is a prevalence of incidental topics that are not directly related to substantive policy issues. As expected, questions challenging government ministers' integrity and moral rectitude consistently receive some of the lowest-quality answers. Topics such as allegations of broken promises, conflicts of interest, corruption, cronyism, ethics, expense scandals, government advertising, lobbying, political fundraising, and transparency rank among the 20 topics with the lowest average cosine similarity between questions and answers for both parties. Similarly, questions in which MPs demand apologies from Cabinet members for alleged misconduct are also associated with low-quality answers from both parties. Many of these topics focus on the "rules of the game," that is, how politicians should practice politics rather than policy. Among policy issues, budget deficits, foreign investments, independence of justice, jobs and unemployment, national security (e.g., Bill C-51 on anti-terrorism), provincial-federal relations (e.g., the Conservative Party's proposed National Securities Regulator and the debate over the HST), and taxes (including the Liberals' landmark carbon tax) are consistently associated with the lowest average cosine similarity, implying that questions about these issues are equally delicate for the Conservative and Liberal parties to address.

In contrast, the topics with the highest average cosine similarity reveal significant differences between the Conservative and Liberal parties. For the Liberal Party, the topics of the questions that prompted the highest-quality answers correspond to issues over which it holds a reputational advantage. These include climate change, the environment, housing, infrastructure, mental health, poverty reduction, relations with Indigenous communities, and seniors. These topics underscore the party's strong reputation for environmental stewardship and social welfare. In contrast, the Conservative Party's top topics feature many unexpected and controversial issues over which the party lacks a clear reputational advantage. These include culture funding, international development, the repatriation of Omar Khadr, rural mail

delivery cuts, sexual misconduct in the military, and the Social Security Tribunal appeals backlog, suggesting that the Conservatives have, to some extent, been more inclined to address questions on divisive or controversial issues. Nevertheless, the Conservative Party's top topics also encompass policy areas over which it has a favorable reputation, such as criminal justice, victims' rights, and international trade. Notably, criminal justice is one of the 20 topics with the lowest average cosine similarity between questions and answers for the Liberal Party, underlining a clear contrast between the two parties.

For both parties, some topics associated with the highest-quality answers, such as Flood Response and Emergency Management, are generally regarded as apolitical and tend to enjoy a broad consensus. Furthermore, the issues with the highest average cosine similarity for both parties include gun control, refugee resettlement, vaccines (against H1N1 for the Conservative Party and COVID-19 for the Liberal Party), and veterans' support. These parallels are surprising, considering the contrasting and often opposing stances the parties adopt on these issues. However, parties' distinct approaches seem to resonate strongly with their respective supporter bases, as is evident from gun control, which may explain their inclination to engage with these contentious issues.

Торіс	Average	Standard Error
Mulroney Schreiber Affair		0.0136
Broken Promises on Income Trusts	0.3029	0.0130
Ethics and Accountability in Government	0.3933	0.0270
Government Transparency and Security Breaches	0.3993	0.0192
"Government Contracts and Fundraising Activities"	0.4123	0.0008
Cuts to Foreign Aid Funding	0.4171	0.0225
Government Advertising Spending	0.4239	0.0203
Lobbying Activities in the Canadian Government	0.4202	0.0243
Foreign Takeover of Potash Industry	0.4411	0.0245
Accountability in Government	0.4464	0.0177
PMO Scandal and Cover-Un	0.4489	0.0107
Budgetary Accountability and Transparency	0.4588	0.0205
Foreign Investment in Natural Resources	0.4621	0.0203
Accountability of Government Spending	0.4672	0.0102
Census Policy and Data Collection	0.4718	0.0210
Budget and Taxation Policy	0.4773	0.0212
Summit Spending Controversies	0.4804	0.0192
Government Accountability and Transparency	0.4837	0.0192
Opposition to Enbridge Northern Gateway Pipeline	0.4856	0.0189
Iob Loss and Economic Instability	0.4858	0.0068
Election Fraud Scandal	0.4859	0.0176
Employment Insurance Reform	0.4987	0.0062
Privacy Oversight and Security Legislation	0.5059	0.0071
Ouebec Securities Jurisdiction	0.5060	0.0188
Social Welfare Policy	0.5082	0.0017
Reproductive Rights and Abortion Access	0.5099	0.0155
Environmental Protection and Assessment Reform	0.5128	0.0169
Access to Information Reform	0.5230	0.0177
Political Interference in Cadman Affair	0.5258	0.0171
Quebec Regional Development Funding Cuts	0.5259	0.0123
Emissions Reduction Targets and Kyoto Protocol	0.5295	0.0147
Economic Growth and Job Creation Strategies	0.5297	0.0136
HST Policy in Canada	0.5302	0.0192
Forestry Industry Loan Guarantees	0.5306	0.0238
Environmental Spill Response Policy	0.5318	0.0136
Aged Workers' Support Program	0.5339	0.0254
Infrastructure Funding and Municipalities	0.5352	0.0071
Trade Protectionism and Job Losses	0.5401	0.0138

Table B.7: Average Cosine Similarity Between Questions and Answers by Topic for the Conservative Party

Tania	Average	Standard Error
Торіс	<b>Cosine Similarity</b>	Stanuaru Error
Digital Divide and Internet Access	0.5407	0.0189
Torture and Detainee Abuse in Afghanistan	0.5409	0.0055
Fuel Price Regulation	0.5409	0.0180
Climate Change Policy	0.5415	0.0050
Forestry Industry Support	0.5445	0.0146
Tax Evasion and Combating Fraud	0.5446	0.0234
Justice Appointment Process Controversy	0.5473	0.0113
Softwood Lumber Agreement	0.5475	0.0179
Election Integrity	0.5499	0.0110
Single Parent Families and Income Splitting	0.5516	0.0190
Auto Sector Crisis	0.5518	0.0210
Federal Defence Procurement	0.5531	0.0060
Electoral Reform	0.5544	0.0129
Copyright Law Reform	0.5547	0.0228
Drug Supply Chain Management	0.5592	0.0198
Credit Card Fee Regulation	0.5604	0.0155
Food Safety Regulation and Enforcement	0.5648	0.0103
Linguistic Rights and Governance	0.5664	0.0102
Seniors' Pension Policy	0.5724	0.0067
Labour Market Abuses and Reform	0.5788	0.0102
Housing Policy and Funding	0.5794	0.0121
Missing and Murdered Indigenous Women and Girls	0.5804	0.0122
Aboriginal Education and Reconciliation	0.5811	0.0064
Immigration Policy Reform	0.5832	0.0112
Farmers' Right to Vote on Agricultural Policy	0.5860	0.0143
Afghanistan Military Mission	0.5865	0.0064
Gender Equality Policy Attacks	0.5868	0.0108
Quebec's GST Compensation	0.5890	0.0196
Funding for Cultural Programs and Events	0.5929	0.0140
Fisheries Management and Sustainability	0.5977	0.0094
Search and Rescue Services	0.5990	0.0176
Crime Policy	0.6012	0.0071
Northern Food Security	0.6013	0.0185
Child Care Policy	0.6027	0.0105
Medical Isotope Supply Crisis	0.6027	0.0128
Rail Safety and Enforcement	0.6047	0.0098
Rail Service and Safety	0.6058	0.0249
Supply Management Policy	0.6063	0.0150

Table B.7: Average Cosine Similarity Between Questions and Answers by Topic forthe Conservative Party

Tonio	Average	Standard Envoy
Торіс	<b>Cosine Similarity</b>	Stanuaru Error
Research Funding Cuts in Canada	0.6066	0.0183
Agricultural Policy and Farmers' Interests	0.6096	0.0106
Youth Unemployment and Job Creation	0.6104	0.0145
Repatriation of Omar Khadr	0.6145	0.0120
CBC Funding and Support	0.6176	0.0117
Refugee Policy and Services	0.6260	0.0107
Health Care Wait Times	0.6261	0.0212
Trade Policy	0.6303	0.0119
Aid to Africa	0.6368	0.0152
Home Delivery Service Cuts	0.6413	0.0102
Gun Control Policy	0.6415	0.0095
Veterans' Services and Support	0.6423	0.0049
Health Care Accord Renewal	0.6437	0.0135
Bridge Tolls and Infrastructure Funding	0.6481	0.0132
Vaccine Distribution and Availability	0.6506	0.0105
Military Sexual Misconduct	0.6683	0.0202
International Threats and Security	0.6726	0.0161
Ukraine Policy and Support	0.6913	0.0186
Humanitarian Aid and Conflict Resolution	0.7066	0.0081

Table B.7: Average Cosine Similarity Between Questions and Answers by Topic for the Conservative Party

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Tonia	Average	Standard Erman	
Торіс	<b>Cosine Similarity</b>	Stanuaru Error	
Ethics Violations and Financial Accountability	0.3649	0.0161	
Financial Conflict of Interest	0.3906	0.0245	
Attorney General Scandal	0.4126	0.0068	
National Security Review of Foreign Takeovers	0.4208	0.0172	
Ethics and Access to Government	0.4353	0.0090	
Criminal Justice Reform	0.4381	0.0230	
Jobs Crisis in Canada	0.4383	0.0168	
Government Accountability on India Trip Controversy	0.4408	0.0168	
Political Interference in the Mark Norman Case	0.4503	0.0131	
Huawei Ban and Security Concerns	0.4509	0.0234	
Defence Minister's Credibility Crisis	0.4600	0.0181	
Apologetics and Respect for Official Languages	0.4615	0.0249	
Cronyism in Fisheries Allocation	0.4644	0.0234	
Financial Conflicts of Interest	0.4650	0.0105	
National Security and Scientific Collaboration	0.4661	0.0165	
Rail Blockades and Economic Impact	0.4674	0.0182	
Government Expense Accountability	0.4731	0.0247	
Federal-Provincial Relations in Quebec	0.4737	0.0180	
Carbon Tax Policy	0.4757	0.0071	
Pipeline Policy and Job Losses	0.4871	0.0184	
Budget and Fiscal Responsibility	0.4876	0.0051	
Energy Policy and Pipeline Development	0.4997	0.0063	
Taxation of Digital Giants	0.5086	0.0241	
Terrorism Reintegration and Security Policy	0.5128	0.0152	
Public Sector Pay System Crisis	0.5133	0.0154	
Accountability and Transparency in Government	0.5279	0.0025	
Privacy and Data Protection	0.5303	0.0112	
Referendum on Electoral Reform	0.5312	0.0085	
Employment Insurance Reform	0.5322	0.0248	
Immigration Policy and Border Control	0.5337	0.0084	
Retirement Security Reform	0.5343	0.0162	
Indigenous Children's Rights	0.5360	0.0123	
Infrastructure Privatization	0.5381	0.0111	
Disability Tax Credit Access Denials	0.5416	0.0189	
Quarantine Policy and Enforcement	0.5466	0.0108	
Softwood Lumber Industry Policy	0.5466	0.0129	
Freedom of Expression Under Attack	0.5528	0.0127	
#MeToo in the Canadian Military	0.5556	0.0106	

Table B.8: Average Cosine Similarity Between Questions and Answers by Topic forthe Liberal Party

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Tonic	Average	Standard Frror
Торк	<b>Cosine Similarity</b>	Stanuaru Error
Rapid COVID-19 Testing Availability	0.5561	0.0139
Canada-China Relations	0.5564	0.0151
Parole System Reform	0.5568	0.0149
Climate Change Policy	0.5663	0.0112
Medical Assistance in Dying Legal Challenges	0.5706	0.0165
Health Care Funding	0.5776	0.0121
Tax Evasion and Conflict of Interest	0.5795	0.0101
Fighter Jet Replacement Policy	0.5810	0.0136
Indigenous Rights and Consultation	0.5853	0.0133
Combat Mission Deployment	0.5866	0.0095
Indigenous Financial Transparency	0.5880	0.0195
Human Rights and Arms Exports to Saudi Arabia	0.5886	0.0167
Trade Agreement Negotiations and Job Losses	0.5895	0.0142
Trade Agreements and Job Protection	0.6037	0.0153
Agricultural Policy and Supply Management	0.6062	0.0074
Marijuana Legalization and Criminal Records	0.6109	0.0136
Middle East Policy and Human Rights	0.6140	0.0096
Appointment Process and Ethics	0.6159	0.0103
Shipbuilding Contract Dispute	0.6160	0.0175
Trade Tariffs and Job Losses	0.6192	0.0175
Child Care Policy	0.6194	0.0136
Small Business Support	0.6293	0.0129
Veteran Benefits and Entitlements	0.6301	0.0094
Aerospace Industry Support	0.6329	0.0075
Indigenous Drinking Water Advisories	0.6360	0.0159
Vaccine Supply Delays and Canada's Ranking	0.6365	0.0064
Indigenous Women's Inquiry	0.6384	0.0142
Job Loss and Economic Impact in Oshawa	0.6392	0.0204
Aging Population and Social Security	0.6397	0.0137
Rural Broadband Access	0.6424	0.0135
Refugee Resettlement Policy	0.6465	0.0213
Opioid Epidemic	0.6476	0.0186
Housing Policy and Investments	0.6506	0.0091
Salmon Conservation and Management	0.6573	0.0119
Public Safety and Gun Control	0.6624	0.0136
Federal Language Policy in Quebec	0.6626	0.0096
Pharmacare Policy	0.6640	0.0150
Gender-Based Violence and Empowerment	0.6657	0.0110

Table B.8: Average Cosine Similarity Between Questions and Answers by Topic forthe Liberal Party

Tonia	Average	Standard Frear
торк	<b>Cosine Similarity</b>	Stanuaru Error
Rail Safety	0.6829	0.0130
Mental Health Services and Accessibility	0.7066	0.0142

Table B.8: Average Cosine Similarity Between Questions and Answers by Topic forthe Liberal Party

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## **B.4 Robustness Check: Pre-Trained Model**

In this section, we describe and comment results from the pre-trained model without fine-tuning.

Figure B.20 illustrates the distribution of cosine similarity estimates between questions and their answers. We also draw the null distribution of the cosine similarity between questions and random answers. Descriptive statistics for this distribution are listed in Table B.9. Remarkably, the distribution of cosine similarity estimates for the pre-trained model is much closer to the corresponding null distribution than the cosine similarity distribution for the fine-tuned model. In other words, the pre-trained model ascribes a much lower relative relevance to observed answers than the fine-tuned model, strongly supporting using the latter for our analysis. Further, Figure B.21 compares cosine similarity estimates between the pre-trained and fine-tuned models, showing they have a significant but moderate correlation.

Figure B.22 illustrates the average cosine similarity between questions and answers conditional on the legislature and the party affiliation of the MP asking the question. The observed patterns closely echo those from the fine-tuned model, implying that our substantive findings are resilient to using the pre-trained model without fine-tuning.

Figure B.23 illustrates the average cosine similarity between questions and answers conditional on the party affiliation and portfolio of the government member responding. Also, Figures B.24 and B.25 display the 20 question topics with the lowest and highest average cosine similarity between questions and answers for the Conservative and Liberal parties, respectively. The observed patterns are generally consistent with those from the fine-tuned model. Yet statistically significant differences in party-neutral average cosine similarities are observed with the pre-trained model, but not the fine-tuned model, for the following portfolios: Democratic Institutions, Finance, Fisheries and Oceans, International Development, and Veterans Affairs. In contrast, we observe statistically significant differences in the fine-tuned model for the following portfolios: Agriculture and Agri-Food, Environment, Foreign Affairs, and Justice. Topic-level results involve fewer changes, except in the relative ordering of topics.



Figure B.20: Distribution of the Cosine Similarity Between Questions and Answers

Count	54,914
Mean	0.5975
<b>Standard Deviation</b>	0.1163
Minimum	0.0923
First Quartile	0.5234
Median	0.6061
Third Quartile	0.6807
Maximum	0.9274

Table B.9: Descriptive Statistics of the Distribution of the Cosine Similarity Between Questions and Answers



Figure B.21: Comparison of Cosine Similarity Estimates Between the Pre-Trained and Fine-Tuned Models



Figure B.22: Average Cosine Similarity Between Questions and Answers by Party and Legislature



Figure B.23: Average Cosine Similarity Between Questions and Answers by Party and Portfolio



Figure B.24: Topics with the 20 Lowest and Highest Average Cosine Similarity Between Questions and Answers for the Conservative Party



Figure B.25: Topics with the 20 Lowest and Highest Average Cosine Similarity Between Questions and Answers for the Liberal Party

## **B.5** Robustness Check: Document Length

A concern with using distance metrics between estimated latent representations as a measure is that sampling errors may mechanically increase their distance and lower their similarity. While this issue affects all latent representations and distance metrics, it is particularly pronounced when dealing with high-dimensional representations, as we do here. This concern has been explored and documented in the existing literature (Gentzkow et al., 2019; Green et al., 2024; van Loon et al., 2022).

A concrete way this concern can manifest is through a correlation between the cosine similarity and the lengths of questions and answers. The intuition is that shorter questions and answers yield embeddings based on less information and, thereby, have a more ample sampling error. Consequently, the cosine similarity between shorter questions and answers may be biased downward. If question and answer lengths differ systematically across parties and legislatures, this could skew our results.

Figures B.26 and B.27 illustrate the average cosine similarity as a function of question and answer lengths. They confirm a statistically significant correlation between the cosine similarity and question and answer lengths. This relationship is downward-sloping for question length such that lengthier questions tend to have a lower cosine similarity, contradicting what we would expect if sampling error introduced a significant bias in cosine similarity estimates. On the other hand, the relationship is upward-sloping for answer length, suggesting that either longer answers have a lower sampling error, longer answers are more relevant to the initial questions, or both.

The potential downward bias in cosine similarity could affect our substantive findings about the relationship between answer quality and the party affiliation of the member of Parliament asking the question, but only if there are systematic differences in question and answer lengths across the latter. Figures B.28 and B.29 reveal systematic variations in the lengths of questions and answers based on the party affiliation of the member of Parliament asking the question and the legislature. Furthermore, Figures B.30 and B.31 illustrate an apparent relationship between estimates of the average cosine similarity and the lengths of questions and answers conditional on the party affiliation of the member of Parliament asking the question and the legislature. It suggests that our substantive findings might be driven, at least partly, by systematic differences in the lengths of questions and answers and could be symptomatic of a downward bias in cosine similarity resulting from sampling error. To mitigate and assess our substantive findings' robustness to any systematic relationship between cosine similarity and the lengths of questions and answers, we calculate the average cosine similarity between questions and answers, conditional on the party affiliation of the MP asking the question and the legislature, after controlling for question and answer lengths. We compute adjusted average cosine similarity estimates with a linear regression model that includes question and answer lengths and party-legislature fixed effects as covariates. We calculate predictions for our inference dataset's average question and answer lengths. Accordingly, they reflect the average cosine similarity if question and answer lengths were the same across all these groups.

Figure B.32 illustrates the estimated average cosine similarity between questions and answers by party and legislature after controlling for question and answer lengths. Similarly, Figure B.33 depicts the average cosine similarity between questions and answers by the party and portfolio of the responding government member, also controlling for question and answer lengths. The observed patterns mirror those discussed in the main text. However, Figure B.33's estimates have larger standard errors. Overall, these results confirm the robustness of our main conclusions to systematic variations in question and answer lengths.



Figure B.26: Average Cosine Similarity Between Questions and Answers by Question Length


Figure B.27: Average Cosine Similarity Between Questions and Answers by Answer Length



Figure B.28: Average Question Length by Party and Legislature



Figure B.29: Average Answer Length by Party and Legislature



Figure B.30: Average Cosine Similarity Between Questions and Answers by Average Question Length



Figure B.31: Average Cosine Similarity Between Questions and Answers by Average Answer Length



Figure B.32: Average Cosine Similarity Between Questions and Answers by Party and Legislature (After Controlling for Question and Answer Lengths)



Figure B.33: Average Cosine Similarity Between Questions and Answers by Party and Portfolio (After Controlling for Question and Answer Lengths)

#### **B.6 Robustness Check: Government Backbenchers**

We conduct a data ablation study to assess the impact of including exchanges initiated by questions from government backbenchers in our training set. In this exercise, we fine-tune our model with a training set that excludes questions from government backbenchers while keeping the same training hyperparameters as the core model.

Figure B.34 illustrates the distribution of cosine similarity estimates generated by the model fine-tuned without questions from government backbenchers in the training data. This distribution excludes estimates for exchanges prompted by questions from government backbenchers. Descriptive statistics for this distribution are listed in Table B.10. Figure B.35 compares the cosine similarity estimates from the core model with those from the model trained without government backbenchers' questions. The estimates are strongly correlated, with a coefficient of 0.9121.

Figure B.36 illustrates the average cosine similarity conditional on the legislature and the party affiliation of the questioning MP. Also, Figure B.37 shows the average cosine similarity conditional on the party affiliation and the portfolio of the Cabinet minister or parliamentary secretary answering the question. Figures B.38 and B.39 illustrate the 20 topics with the lowest and highest average cosine similarity between questions and answers for the Conservative and Liberal parties, respectively. These figures confirm that our core substantive findings are robust, even when we exclude exchanges involving government backbenchers from the training data. Notably, our observation that the Conservative Party engages with controversial issues over which it lacks a clear reputational advantage continues to hold.



Figure B.34: Distribution of the Cosine Similarity Between Questions and Answers

Count	50,818
Mean	0.5203
<b>Standard Deviation</b>	0.1811
Minimum	-0.1995
First Quartile	0.4032
Median	0.5411
Third Quartile	0.6575
Maximum	0.9396
Maximum	0.9396

Table B.10: Descriptive Statistics of the Distribution of the Cosine SimilarityBetween Questions and Answers



Figure B.35: Comparison of Cosine Similarity Estimates Between the Main Model and Model Without Government Backbenchers



Figure B.36: Average Cosine Similarity Between Questions and Answers by Party and Legislature



Figure B.37: Average Cosine Similarity Between Questions and Answers by Party and Portfolio



Figure B.38: Topics with the 20 Lowest and Highest Average Cosine Similarity Between Questions and Answers for the Conservative Party



Figure B.39: Topics with the 20 Lowest and Highest Average Cosine Similarity Between Questions and Answers for the Liberal Party

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# Appendix C

# SUPPLEMENTARY MATERIAL FOR CHAPTER 3

### C.1 Equilibrium Definition

The Incumbent's strategy is characterized by:

- (i) The policy enacted by high-ability incumbents in the first period conditional on the state of the world, denoted  $y_1(h, \omega_1)$ .
- (ii) The probability that low-ability incumbents enact policy a in the first period, denoted  $\sigma$ .
- (iii) The policy enacted by high-ability politicians in the second period conditional on the state of the world, denoted  $y_2(h, \omega_1)$ .
- (iv) The policy enacted by low-ability politicians in the second period, denoted  $y_2(\ell)$ .

The Challenger's strategy is characterized by:

- (i) The probability that the Challenger runs for office given the Incumbent's firstperiod policy decision and the posterior probability that she has a high ability, denoted  $\rho^y$ .
- (ii) The policy enacted by high-ability politicians in the second period conditional on the state of the world, denoted  $y_2(h, \omega_1)$ .
- (iii) The policy enacted by low-ability politicians in the second period, denoted  $y_2(\ell)$ .

The definition of strategies for both the Incumbent and the Challenger relies on the fact that they encounter identical policymaking decisions in the second period, leading them to adopt the same strategy at this stage of the game.

The Voter's strategy is characterized by the probability that they reelect the Incumbent when the Challenger decides to contest the election, given the Incumbent's first-period policy decision and the posterior probability that she has a high ability, denoted  $v^y$ . For simplicity, consistent with my argument in Section 3.3, this definition leaves out the Voter's electoral behavior when the Incumbent's type is revealed before the election.

#### **Definition C.1.** An equilibrium is a tuple

$$\left\langle \sigma, (y_1(h,\omega_1))_{\omega_1 \in \Omega}, (\rho^y)_{y \in Y}, (v^y)_{y \in Y}, y_2(\ell), (y_2(h,\omega_2))_{\omega_2 \in \Omega}, (\kappa^y)_{y \in Y} \right\rangle$$

such that:

(i) Given the state of the world  $\omega_2 \in \Omega$ , the policy enacted by high-ability politicians in the second period, denoted as  $y_2(h, \omega_2)$ , maximizes their policy payoffs:

$$y_2(h,\omega_2) \in \underset{y \in Y}{\operatorname{arg\,max}} u(y,\omega_2);$$

(ii) The policy enacted by low-ability politicians in the second period, denoted as  $y_2(\ell)$ , maximizes their expected policy payoffs:

$$y_{2}(\ell) \in \underset{y \in Y}{\arg \max} \pi u(y, a) + (1 - \pi) u(y, b);$$

(iii) When the Challenger opts to participate in the election, the Voter reelects the Incumbent with a probability  $v^y$  that maximizes their expected policy payoffs given the Incumbent's first-period policy decision y and the posterior probability that she has a high ability:

$$v^{y} \in \underset{v \in [0,1]}{\arg \max} v \left[ \kappa^{y} u_{2}(h) + (1 - \kappa^{y}) u_{2}(\ell) \right] + (1 - v) \left[ \gamma u_{2}(h) + (1 - \gamma) u_{2}(\ell) \right],$$

where

$$u_{2}(\ell) = \pi u (y_{2}(\ell), a) + (1 - \pi) u (y_{2}(\ell), b)$$

and

$$u_{2}(h) = \pi u (y_{2}(h, a), a) + (1 - \pi) u (y_{2}(h, b), b)$$

are the policy payoffs expected from a low-ability and a high-ability politician holding office in the second period, respectively;

(iv) Given the Incumbent's first-period policy decision y and the posterior probability that she has a high ability, the Challenger runs for office with a probability  $\rho^{y}$  that maximizes his expected payoffs:

$$\rho^{y} \in \underset{\rho \in [0,1]}{\arg \max} \rho \left[ q_{i} \left( 1 - \kappa^{y} \right) + \left( 1 - q_{i} \right) \left( 1 - \nu^{y} \right) - c \right] \left[ \gamma \times 1 + \left( 1 - \gamma \right) \pi \right];$$

(v) Given the state of the world  $\omega_1 \in \Omega$ , the policy enacted by high-ability incumbents in the first period, denoted as  $y_1(h, \omega_1)$ , maximizes their expected payoffs:

$$y_{1}(h,\omega_{1}) \in \underset{y \in Y}{\arg \max} u(y,\omega_{1}) + \delta \left[\rho^{y}(q_{i} + (1 - q_{i})v^{y}) + (1 - \rho^{y})\right] u_{2}(h);$$

(vi) Low-ability incumbents enact policy a in the first period with a probability  $\sigma$  that maximizes their expected payoffs:

$$\sigma \in \underset{s \in [0,1]}{\arg \max s} \left\{ \begin{array}{l} \pi \ u \ (a,a) + (1-\pi) \ u \ (a,b) \\ +\delta \left[ \rho^a \ (1-q_i) \ v^a + (1-\rho^a) \right] u_2 \ (\ell) \right\} \\ + \left( 1-s \right) \left\{ \begin{array}{l} \pi \ u \ (b,a) + (1-\pi) \ u \ (b,b) \\ +\delta \left[ \rho^b \ (1-q_i) \ v^b + \left( 1-\rho^b \right) \right] u_2 \ (\ell) \right\}; \end{array} \right\}$$

(vii) The posterior probability that the Incumbent has a high ability conditional on enacting policy  $y \in Y$  in the first period is computed using Bayes' Rule:

$$\kappa^{y} = \frac{\kappa \left[\pi \mathbf{1} \{y_{1}(h, a) = y\} + (1 - \pi) \mathbf{1} \{y_{1}(h, b) = y\}\right]}{\kappa \left[\pi \mathbf{1} \{y_{1}(h, a) = y\} + (1 - \pi) \mathbf{1} \{y_{1}(h, b) = y\}\right]} + (1 - \kappa) \left[\sigma \mathbf{1} \{y = a\} + (1 - \sigma) \mathbf{1} \{y = b\}\right].$$

### C.2 Equilibrium Analysis Without Endogenous Challenger Entry

**Proposition C.1.** In equilibrium, high-ability incumbents enact the policy corresponding to the state of the world in the first period.

Low-ability incumbents invariably enact policy a in the first period if the following condition holds:

$$\frac{2\pi-1}{\delta\pi} > 1 - q_i.$$

In this case, when the Voter does not observe the Incumbent's type before the election, they reelect the Incumbent after she enacted policy a in the first period if  $\kappa \geq \frac{\gamma}{\gamma+(1-\gamma)\pi}$ , replace her with the Challenger otherwise, and reelect the Incumbent with certainty after she enacted policy b.

If the condition above does not hold, the model's equilibria are as follows:

(i) If  $\kappa < \gamma$ :

• Low-ability incumbents enact policy a in the first period with probability  $\sigma = 1 - \frac{\kappa(1-\gamma)(1-\pi)}{(1-\kappa)\gamma};$ 

• When the Incumbent's type is not exogenously revealed before the election, they replace the Incumbent with the Challenger with certainty after she enacted policy a in the first period and reelect the Incumbent with probability  $v^b = \frac{2\pi - 1}{\delta \pi (1 - q_i)}$  after she enacted policy b;

(*ii*) If 
$$\kappa \in \left(\gamma, \frac{\gamma}{\gamma + (1 - \gamma)\pi}\right)$$
:

- Low-ability incumbents enact policy a in the first period with probability  $\sigma = \frac{\kappa(1-\gamma)\pi}{(1-\kappa)\gamma};$
- When the Incumbent's type is not exogenously revealed before the election, they reelect the Incumbent with probability  $v^a = 1 - \frac{2\pi - 1}{\delta \pi (1 - q_i)}$  after she enacted policy a in the first period and with certainty after she enacted policy b;

(iii) If 
$$\kappa > \frac{\gamma}{\gamma + (1 - \gamma)\pi}$$
:

- Low-ability incumbents enact policy a in the first period;
- When the Incumbent's type is not exogenously revealed before the election, they reelect the Incumbent with certainty, irrespective of her firstperiod policy decision.

*Proof.* I begin by characterizing high-ability incumbents' policy decisions.

Given the state of the world  $\omega_1$ , it is sequentially rational for high-ability incumbents to enact the policy corresponding to the state of the world in the first period if and only if the following holds:

$$1 + \delta \bar{v}_i(h, v^{\omega_1}) \times 1 \ge 0 + \delta \bar{v}_i(h, v^{-\omega_1}) \times 1.$$

I use  $-\omega_1$  to denote the policy opposite to the state of the world  $\omega_1$ .

This can be rearranged as follows:

$$\delta\left[\bar{v}_{i}\left(h,v^{-\omega_{1}}\right)-\bar{v}_{i}\left(h,v^{\omega_{1}}\right)\right]\leq1.$$

This equation stipulates that when pondering which policy to enact in the first period, high-ability incumbents weigh the cost of enacting the "wrong" policy against the resulting improvement in their reelection prospects.

Since it is the difference between two probabilities, the improvement in high-ability incumbents' reelection prospects associated with implementing the policy that does not correspond to the state of the world is bounded above by one:

$$\bar{v}_i(h;\gamma,\nu^{-\omega}) - \bar{v}_i(h;\gamma,\nu^{\omega}) \le 1.$$

Combined with the assumption that the discount factor  $\delta$  has a value strictly lower than one, it follows that the previous equation must hold with strict inequality:

$$\delta\left[\bar{v}_{i}\left(h;\gamma,\nu^{-\omega}\right)-\bar{v}_{i}\left(h;\gamma,\nu^{\omega}\right)\right]\leq\delta\times1<1.$$

Therefore, in equilibrium, high-ability incumbents necessarily enact the policy corresponding to the state of the world in the first period.

Now, I characterize low-ability incumbents' policy decisions.

It is sequentially rational for low-ability incumbents to enact policy *a* in the first period if and only if the following holds:

$$\pi \times 1 + (1 - \pi) \times 0 + \delta \pi \, \bar{v}_i(\ell, \nu^a) \ge \pi \times 0 + (1 - \pi) \times 1 + \delta \pi \, \bar{v}_i(\ell, \nu^b).$$

This can be rearranged as follows:

$$\bar{v}_i(\ell, \nu^b) - \bar{v}_i(\ell, \nu^a) \le \frac{2\pi - 1}{\delta \pi}.$$
(C.1)

This inequality stipulates that, when pondering which policy to enact in the first period, low-ability incumbents weigh the cost of enacting policy b, which is less likely to match the state of the world than policy a, relative to the benefits of holding office in the second period against the resulting improvement in their reelection prospects.

Leveraging Section 3.3, it can be easily demonstrated that the left-hand side of Equation (C.1) equals:

$$\bar{v}_i(\ell;\gamma,\nu^b) - \bar{v}_i(\ell;\gamma,\nu^a) = (1-q_i)\left(\nu^b - \nu^a\right).$$

Sequential rationality of the Voter's actions imposes that, absent exogenous information about the Incumbent's type before the election, they elect the candidate who is most likely to have a high ability:

$$v^{y} = 1 (0) \Rightarrow \kappa^{y} \ge (\le) \gamma.$$

.

Since it equals the difference between two probabilities, the potential improvement in low-ability incumbents' reelection probability from enacting policy b, absent exogenous information about the Incumbent's private type before the election, is bounded above by one:

$$v^b - v^a \le 1.$$

It follows that if  $\frac{2\pi-1}{\delta\pi} \ge 1 - q_i$ , Equation (C.1) necessarily holds, reflecting the fact that the cost of enacting policy *b* in the first period systematically outweighs the potential improvement in low-ability incumbents' reelection prospects. In this case, low-ability incumbents invariably enact policy *a* in the first period. On the other hand, if  $\frac{2\pi-1}{\delta\pi} < 1 - q_i$ , the potential improvement in low-ability incumbents' reelection prospects may be sufficiently valuable for them to distort their policy decisions in equilibrium.

Equation (C.1) must hold in equilibrium. Let us assume it did not. In this case, lowability incumbents would find it sequentially rational to enact policy b invariably in the first period. Accordingly, if she enacted policy a, the Voter would deduce that the Incumbent has a high ability. This would negate the electoral benefits associated with policy b, thus eliminating the Incumbent's motives for distorting her policy decisions in the first place.

Henceforth, I distinguish two cases: whether Equation (C.1) holds with strict inequality or with equality in equilibrium.

In the first case, low-ability incumbents invariably enact policy *a* in the first period. Accordingly, the Voter infers the Incumbent has a high ability if she enacted policy *b* in the first period, ensuring her reelection. In contrast, if she enacted policy *a*, she has a probability  $\kappa^a = \frac{\kappa \pi}{\kappa \pi + (1-\kappa)}$  of having a high ability.

Since I am considering the case wherein low-ability incumbents find the potential improvement in their reelection prospects from enacting policy b sufficiently valuable, it is sequentially rational for them to invariably enact policy a in the first period only if they are guaranteed to be reelected after doing so. For this to occur in equilibrium, the Incumbent must be sufficiently likely to have a high ability after enacting policy a in the first period such that, absent exogenous disclosure of the Incumbent's type before the election, the Voter finds it sequentially rational to reelect the Incumbent rather than replace her with the Challenger:

$$v^a = 1 \Longrightarrow \kappa^a \ge \gamma.$$

This condition can be reformulated as follows:

$$\kappa^{a} = \frac{\kappa \pi}{\kappa \pi + (1 - \kappa)} \ge \gamma \Leftrightarrow \kappa \ge \frac{\gamma}{\gamma + (1 - \gamma) \pi}.$$

In the second case, low-ability incumbents are indifferent between enacting both policies in the first period. Accordingly, they are willing to randomize between enacting each policy in the first period. In equilibrium, the extent to which they do must be set to make the Voter indifferent between reelecting the Incumbent or replacing her with the Challenger after she has enacted one of the two available policies:

$$\kappa^{y} = \gamma.$$

In turn, after the Incumbent has enacted one of the two available policies, the Voter must randomize between reelecting her and replacing her with the Challenger to the extent that low-ability incumbents are indifferent between enacting both policies:

$$(1-q_i)\left(\nu^b-\nu^a\right)=\frac{2\pi-1}{\delta\pi}.$$

For this equation to hold, the Incumbent must be more likely to be reelected after enacting policy *b* than after enacting policy *a*. Formally, this means that we must have  $v^b > v^a$ . In turn, sequential rationality of the Voter's electoral choices imposes that we have  $\kappa^b > \kappa^a$ .

Given that in equilibrium, the Voter can only randomize between reelecting the Incumbent and replacing her with the Challenger after she has enacted one of the policies, there are two subcases to consider: the one wherein the Voter is indifferent between reelecting the Incumbent and replacing her with the Challenger after she has enacted policy a, and the other wherein they are indifferent after the Incumbent has enacted policy b.

In the first subcase, low-ability incumbents enact policy a with a probability  $\sigma$ , making the posterior probability that the Incumbent has a high ability conditional on having enacted policy a in the first period equal to the probability that the Challenger has a high ability:

$$\kappa^{a} = \frac{\kappa\pi}{\kappa\pi + (1-\kappa)\,\sigma} = \gamma \Leftrightarrow \sigma = \frac{\kappa\,(1-\gamma)\,\pi}{(1-\kappa)\,\gamma}.$$

Demonstrably, this value of  $\sigma$  is strictly positive. This value must also be lower than one, which translates into the following condition:

$$\frac{\kappa \left(1-\gamma\right) \pi}{\left(1-\kappa\right) \gamma} \leq 1 \Leftrightarrow \kappa \leq \frac{\gamma}{\gamma + \left(1-\gamma\right) \pi}.$$

To ensure sequential rationality of the Voter's electoral choices, the Incumbent must have a higher posterior probability of having a high ability conditional on having enacted policy b in the first period than the Challenger:

$$\kappa^{b} = \frac{\kappa \left(1 - \pi\right)}{\kappa \left(1 - \pi\right) + \left(1 - \kappa\right) \left(1 - \sigma\right)} \ge \gamma \Leftrightarrow \kappa \ge \gamma.$$

In the second subcase, low-ability incumbents enact policy b with a probability  $\sigma$ , making the posterior probability that the Incumbent has a high ability conditional on having enacted policy b in the first period equal to the probability that the Challenger has a high ability:

$$\kappa^{b} = \frac{\kappa \left(1 - \pi\right)}{\kappa \left(1 - \pi\right) + \left(1 - \kappa\right) \left(1 - \sigma\right)} = \gamma \Leftrightarrow \sigma = 1 - \frac{\kappa \left(1 - \gamma\right) \left(1 - \pi\right)}{\left(1 - \kappa\right) \gamma}$$

Demonstrably, this value of  $\sigma$  is strictly lower than one. This value must also be positive, which translates into the following condition:

$$1 - \frac{\kappa \left(1 - \gamma\right) \left(1 - \pi\right)}{\left(1 - \kappa\right) \gamma} \ge 0 \Leftrightarrow \kappa \le \frac{\gamma}{\gamma + \left(1 - \gamma\right) \left(1 - \pi\right)}$$

To ensure sequential rationality of the Voter's electoral choices, the Incumbent must have a higher posterior probability of having a high ability conditional on having enacted policy a in the first period than the Challenger:

$$\kappa^{a} = \frac{\kappa \pi}{\kappa \pi + (1 - \kappa) \, \sigma} \leq \gamma \Leftrightarrow \kappa \leq \gamma.$$

Note that this condition is the only one binding since the previous must necessarily hold if this one does.  $\hfill \Box$ 

### C.3 Proof of Lemma 3.1

*Proof.* Equation (3.1) characterizes the conditions under which it is sequentially rational for the Challenger to run for office:

$$\kappa^{y} \leq \frac{1 - (1 - q_i) \nu^{y} - c}{q_i}$$

This equation does not directly describe the Challenger's equilibrium entry strategy. The reason is that both sides depend on  $\kappa^y$ . Indeed, the left-hand side contains it explicitly, whereas the right-hand side contains  $\nu^y$ , which depends on  $\kappa^y$  through the sequential rationality of the Voter's electoral behavior. Specifically, sequential

rationality requires that the Voter elects the candidate who is most likely to have a high ability to hold office in the second period:

$$v^{y} = 1 (0) \Longrightarrow \kappa^{y} \ge (\le) \gamma.$$

To characterize the Challenger's equilibrium entry strategy, it is necessary to consider three scenarios contingent upon the value of  $v^y$ .

First, if  $v^y = 1$ , the right-hand side of Equation (3.1) equals  $1 - \frac{c}{q_i}$ , which I hereafter denote by  $\underline{\kappa}$ . Sequential rationality of the Voter's electoral choices imposes that we have  $\kappa^y \ge \gamma$ . Both conditions cannot concurrently hold unless  $\gamma < \underline{\kappa}$ . In this case, the Challenger runs for office if and only if  $\kappa^y \in (\gamma, \underline{\kappa})$ . If  $\kappa^y = \underline{\kappa}$ , the Challenger may randomize between contesting the election and conceding to the Incumbent as he is indifferent between both.

Second, if  $v^y = 0$ , the right-hand side of Equation (3.1) equals  $\frac{1-c}{q_i}$ , which I hereafter denote by  $\bar{\kappa}$ . Sequential rationality of the Voter's electoral choices imposes that we have  $\kappa^y \leq \gamma$ . Consequently, the Challenger runs for office if and only if  $\kappa^y \leq \min \{\gamma, \bar{\kappa}\}$ . If  $\bar{\kappa} < \gamma$ , this means that the Challenger runs for office if and only if  $\kappa^y \leq \bar{\kappa}$ . Also, if  $\kappa^y = \bar{\kappa}$ , the Challenger may randomize between contesting the election and conceding to the Incumbent as he is indifferent between both. On the other hand, if  $\bar{\kappa} > \gamma$ , this means that the Challenger runs for office if and only if  $\kappa^y \leq \gamma$ .

Third, if  $v^y \in (0, 1)$ , the right-hand side of Equation (3.1) equals a value between  $\underline{\kappa}$  and  $\overline{\kappa}$ . Sequential rationality of the Voter's electoral choices requires that we have  $\kappa^y = \gamma$ . Generically, it occurs only if  $\sigma \in (0, 1)$ . This requires that low-ability incumbents be indifferent between enacting both policies in the first period and that  $v^y$  be defined as such. In this case, the Challenger runs for office if and only if the probability that the Challenger has high ability is lower than or equal to the right-hand side of Equation (3.1) induced by this value of  $v^y$ .

The value of  $v^y$  may also be set to make the Challenger indifferent between running for office or not:

$$v^{y} = \frac{q_{i}\left(\bar{\kappa} - \gamma\right)}{1 - q_{i}} =: \hat{v}$$

In this case, the Challenger may randomize between running and not running. He must do so to make the Voter indifferent between reelecting the Incumbent and replacing her with the Challenger, absent any exogenous information about the Incumbent's type before the election.  $\Box$ 



Figure C.1: The Challenger's Entry Strategy

Figure C.1 illustrates the Challenger's equilibrium entry strategy. The areas over which the Challenger runs for office are crosshatched or shaded. The horizontal axis represents the probability that the Challenger has a high ability. The vertical axis represents the posterior probability that the Incumbent has a high ability given her first-period policy decision. The crosshatched area highlights the cases wherein: (i) the Challenger runs for office, and (ii) the Incumbent is necessarily reelected absent exogenous information disclosure about her type before the election. The shaded area highlights the cases wherein: (i) the Challenger runs for office, and (ii) he necessarily replaces the Incumbent absent exogenous information disclosure about her type before the election.

# C.4 Proof of Lemma 3.2

*Proof.* I consider three scenarios contingent on the value of  $\gamma$  relative to the thresholds  $\kappa$  and  $\bar{\kappa}$ .

First, I consider the case in which  $\gamma < \underline{\kappa}$ .

If  $\kappa^y < \gamma$ , the Voter replaces the Incumbent with the Challenger when no exogenous information about her type is revealed before the election. Since  $\gamma < \underline{\kappa} < \overline{\kappa}$ , it is sequentially rational for the Challenger to run for office. It follows that low-ability incumbents' reelection probability is null. Note that if  $\kappa^y = \gamma$ , all values in the interval  $[0, 1 - q_i]$  can be sustained in equilibrium since the Voter is indifferent between reelecting the Incumbent and replacing her with the Challenger.

At the other end of the spectrum, if  $\kappa^y > \bar{\kappa}$ , it is sequentially rational for the Challenger not to run for office. Since  $\gamma < \kappa < \bar{\kappa}$ , it is sequentially rational for the Voter to reelect the Incumbent absent exogenous information about her type before the election. It follows that the Incumbent is reelected with certainty. Note that if  $\kappa^y = \bar{\kappa}$ , all values in the interval  $[1 - q_i, 1]$  can be sustained in equilibrium since the Challenger is indifferent between contesting the election and conceding to the Incumbent.

If  $\kappa^{y} \in (\gamma, \underline{\kappa})$ , it is sequentially rational for the Challenger to run for office and for the Voter to reelect the Incumbent absent exogenous information about her type before the election. It follows that low-ability incumbents' reelection probability is  $1 - q_i$ .

Second, I consider the case in which  $\gamma \in (\underline{\kappa}, \overline{\kappa})$ .

If  $\kappa^{y} < \gamma$ , it is sequentially rational for the Challenger to run for office and for the Voter to replace the Incumbent with the Challenger absent exogenous information about her type before the election. In this case, low-ability incumbents' reelection probability is null.

On the other hand, if  $\kappa^{y} > \gamma$ , it is sequentially rational for the Challenger to concede to the Incumbent and for the Voter to reelect the Incumbent absent exogenous information about her type before the election. In this case, low-ability incumbents' reelection is guaranteed.

I now consider the case when  $\kappa^y = \gamma$ . In this case, I show that there are equilibrium values of  $\nu^y$  and  $\rho^y$  such that low-ability incumbents' reelection probability can take any value in the interval [0, 1] in equilibrium. Note that since  $\gamma \in (\underline{\kappa}, \overline{\kappa})$ , there is a value of  $\nu^y \in (0, 1)$  such that the right-hand side of Equation (3.1) equals  $\gamma$ . I denote this value as  $\hat{\nu}$ :

$$\hat{\nu} = \frac{q_i \left(\bar{\kappa} - \gamma\right)}{1 - q_i}.$$

If  $v^y < \hat{v}$ , the Challenger necessarily runs for office. In contrast, if  $v^y > \hat{v}$ , the Challenger concedes to the Incumbent.

Given that  $\kappa^y = \gamma$ , the Voter is indifferent between reelecting the Incumbent and replacing her with the Challenger. Thus, all values of  $v^y \in (0, 1)$  can be sustained in equilibrium. Further, if  $v^y \leq \bar{v}$ , it is sequentially rational for the Challenger to run for office. It follows that all values in the interval  $[0, (1 - q_i)\bar{v}]$  can be sustained as equilibrium values of low-ability incumbents' reelection probability.

If  $\kappa^y = \gamma$  and  $\nu^y = \bar{\nu}$ , the Challenger is indifferent between contesting the election and conceding to the Incumbent. In this case, all values of  $\rho^y \in (0, 1)$  are sustainable in equilibrium. This implies that all values in the interval  $[(1 - q_i)\bar{\nu}, 1]$  can be sustained as equilibrium values of low-ability incumbents' reelection probability.

Third, I consider the case in which  $\gamma > \bar{\kappa}$ .

If  $\kappa^{y} < \bar{\kappa}$ , it is sequentially rational for the Challenger to run for office. Also, since  $\gamma > \bar{\kappa}$ , the Voter replaces the Incumbent absent exogenous information about her type before the election. It follows that low-ability incumbents' reelection probability is null.

Next, if  $\kappa^y = \bar{\kappa}$ , the Challenger is indifferent between contesting the election and conceding to the Incumbent, hence all values in the interval [0, 1] can be sustained as equilibrium values of low-ability incumbents' reelection probability.

Finally, if  $\kappa^{y} > \bar{\kappa}$ , it is sequentially rational for the Challenger not to run for office. This is true if  $\kappa^{y} < \gamma$  and the Voter replaces the Incumbent with the Challenger absent exogenous information about her type before the election and even more if  $\kappa^{y} > \gamma$  and the Voter reelects the Incumbent absent exogenous information about her type before the election. It follows that low-ability incumbents are reelected with certainty.

### C.5 Equilibrium Analysis With Endogenous Challenger Entry

**Proposition C.2.** *In equilibrium, low-ability incumbents invariably enact policy a in the first period if the following condition is met:* 

$$\frac{2\pi-1}{\delta\pi} > 1.$$

If this condition does not hold, the probability that low-ability incumbents enact policy a in the first period is as follows:

- If 
$$\underline{\kappa} < \frac{\gamma}{\gamma + (1 - \gamma)\pi}$$
 and  $\kappa \in \left(\underline{\kappa}, \frac{\gamma}{\gamma + (1 - \gamma)\pi}\right)$ :  

$$\sigma = \sigma = \frac{\kappa (1 - \gamma) \pi}{(1 - \kappa) \gamma};$$
- If  $\kappa > \max\left\{\underline{\kappa}, \frac{\gamma}{\gamma + (1 - \gamma)\pi}\right\}$ :  

$$\sigma = 1;$$

$$(b) If \gamma \in (\underline{\kappa}, \overline{\kappa}):$$

$$(i) If \kappa < \gamma:$$

$$\sigma = 1 - \frac{\kappa (1 - \gamma) (1 - \pi)}{(1 - \kappa) \gamma};$$

$$(ii) If \kappa \in (\gamma, \frac{\gamma}{\gamma + (1 - \gamma)\pi}):$$

$$\sigma = \frac{\kappa (1 - \gamma) \pi}{(1 - \kappa) \gamma};$$

$$(iii) If \kappa > \frac{\gamma}{\gamma + (1 - \gamma)\pi}:$$

$$\sigma = 1;$$

(c) If  $\gamma > \bar{\kappa}$ : (i) If  $\kappa < \bar{\kappa}$ : (ii) If  $\kappa < \bar{\kappa}$ : (iii) If  $\kappa \in \left(\bar{\kappa}, \frac{\bar{\kappa}}{\bar{\kappa} + (1 - \bar{\kappa})\pi}\right)$ : (iii) If  $\kappa > \frac{\bar{\kappa}}{\bar{\kappa} + (1 - \bar{\kappa})\pi}$ :  $\sigma = \frac{\kappa (1 - \bar{\kappa})\pi}{(1 - \kappa)\bar{\kappa}}$ ; (iii) If  $\kappa > \frac{\bar{\kappa}}{\bar{\kappa} + (1 - \bar{\kappa})\pi}$ :  $\sigma = 1$ .

## C.6 Proof of Proposition 3.3

*Proof.* As a preamble, note that the thresholds  $\underline{\kappa}$  and  $\overline{\kappa}$  have an identical partial derivative with respect to parameter *c* and, in particular, marginally decrease with its value:

$$\frac{\partial \underline{\kappa}}{\partial c} = \frac{\partial \bar{\kappa}}{\partial c} = \frac{-1}{q_i}.$$

There are two sets of conditions under which the equilibrium probability that lowability incumbents enact policy a in the first period depends positively on the value of c:

(i) 
$$\gamma < \underline{\kappa}, \frac{2\pi - 1}{\delta \pi} < q_i$$
, and  $\kappa \in \left(\underline{\kappa}, \frac{\underline{\kappa}}{\underline{\kappa} + (1 - \underline{\kappa})\pi}\right)$ ; or  
(ii)  $\gamma > \overline{\kappa}$  and  $\kappa \in \left(\overline{\kappa}, \frac{\overline{\kappa}}{\overline{\kappa} + (1 - \overline{\kappa})\pi}\right)$ .

I consider each case in turn.

In the first case, the probability that low-ability incumbents enact policy a in the first period equals:

$$\sigma = \frac{\kappa \left(1 - \underline{\kappa}\right) \pi}{\left(1 - \kappa\right) \underline{\kappa}}.$$

The partial derivative of this probability with respect to parameter c equals:

$$\frac{\partial \sigma}{\partial c} = \frac{\kappa \pi}{1 - \kappa} \frac{\partial \left(\frac{1 - \underline{\kappa}}{\underline{\kappa}}\right)}{\partial c} = \frac{\kappa \pi}{1 - \kappa} \frac{-\frac{\partial \underline{\kappa}}{\partial c}}{\underline{\kappa}^2} = \frac{\kappa \pi}{q_i \left(1 - \kappa\right) \underline{\kappa}^2} > 0.$$

Accordingly, the equilibrium probability that low-ability incumbents enact policy a in the first period marginally increases with the value of c.

I now rearrange the conditions outlined in point (i) so that they are expressed as bounds on the value of the parameter c.

First,  $\gamma < \kappa$  can be rearranged as follows:

$$\gamma < \underline{\kappa} = 1 - \frac{c}{q_i} \Leftrightarrow c < q_i (1 - \gamma).$$

Second,  $\kappa > \kappa$  can be rearranged as follows:

$$\kappa > \underline{\kappa} = 1 - \frac{c}{q_i} \Leftrightarrow c > q_i (1 - \kappa).$$

Third,  $\kappa < \frac{\underline{\kappa}}{\underline{\kappa} + (1-\underline{\kappa})\pi}$  can be rearranged as follows:

$$\begin{split} \kappa < \frac{\underline{\kappa}}{\underline{\kappa} + (1 - \underline{\kappa})\pi} &= \frac{\underline{\kappa}}{\pi + (1 - \pi)\underline{\kappa}} \\ \Leftrightarrow \frac{\pi \kappa}{1 - (1 - \pi)\kappa} < \underline{\kappa} = 1 - \frac{c}{q_i} \Leftrightarrow c < q_i \left( 1 - \frac{\pi \kappa}{1 - (1 - \pi)\kappa} \right). \end{split}$$

Combined, these conditions can be expressed as follows:

$$\begin{aligned} q_i \left(1-\kappa\right) < c < \min\left\{q_i \left(1-\frac{\pi\kappa}{1-(1-\pi)\kappa}\right), q_i \left(1-\gamma\right)\right\} \\ &= q_i \left(1-\max\left\{\frac{\pi\kappa}{1-(1-\pi)\kappa}, \gamma\right\}\right). \end{aligned}$$

These conditions may hold only if  $\kappa > \gamma$ .

In the second case, the probability that low-ability incumbents enact policy *a* in the first period equals:

$$\sigma = \frac{\kappa \left(1 - \bar{\kappa}\right) \pi}{\left(1 - \kappa\right) \bar{\kappa}}.$$

The partial derivative of this probability with respect to parameter c equals:

$$\frac{\partial \sigma}{\partial c} = \frac{\kappa \pi}{1 - \kappa} \frac{\partial \left(\frac{1 - \bar{\kappa}}{\bar{\kappa}}\right)}{\partial c} = \frac{\kappa \pi}{1 - \kappa} \frac{-\frac{\partial \bar{\kappa}}{\partial c}}{\bar{\kappa}^2} = \frac{\kappa \pi}{q_i \left(1 - \kappa\right) \bar{\kappa}^2} > 0.$$

Accordingly, the equilibrium probability that low-ability incumbents enact policy a in the first period marginally increases with the value of c.

I now rearrange the conditions outlined in point (ii) so that they are expressed as bounds on the value of the parameter c.

First,  $\gamma > \bar{\kappa}$  can be rearranged as follows:

$$\gamma > \bar{\kappa} = \frac{1-c}{q_i} \Leftrightarrow c > 1-q_i\gamma.$$

Second,  $\kappa > \bar{\kappa}$  can be rearranged as follows:

$$\kappa > \bar{\kappa} = \frac{1-c}{q_i} \Leftrightarrow c > 1-q_i\kappa.$$

Third,  $\kappa < \frac{\bar{\kappa}}{\bar{\kappa} + (1 - \bar{\kappa})\pi}$  can be rearranged as follows:

$$\kappa < \frac{\bar{\kappa}}{\bar{\kappa} + (1 - \bar{\kappa})\pi} = \frac{\bar{\kappa}}{\pi + (1 - \pi)\bar{\kappa}}$$
$$\Leftrightarrow \frac{1 - c}{q_i} = \bar{\kappa} > \frac{\pi\kappa}{1 - (1 - \pi)\kappa} \Leftrightarrow c < 1 - \frac{q_i\pi\kappa}{1 - (1 - \pi)\kappa}$$

Combined, these conditions can be expressed as follows:

$$1 - q_i \min{\{\kappa, \gamma\}} = \max{\{1 - q_i \kappa, 1 - q_i \gamma\}} < c < 1 - \frac{q_i \pi \kappa}{1 - (1 - \pi) \kappa}.$$

These conditions may hold only if  $\gamma > \frac{\pi\kappa}{1-(1-\pi)\kappa}$ .

### C.7 Proof of Proposition 3.4

*Proof.* When the Challenger always runs for office, the Voter's welfare equals:

$$\kappa \left[\pi u \left(y_1(h, a), a\right) + (1 - \pi) u \left(y_1(h, b), b\right)\right] + (1 - \kappa) \left[\sigma \left(\pi u \left(a, a\right) + (1 - \pi) u \left(a, b\right)\right) + (1 - \sigma) \left(\pi u \left(b, a\right) + (1 - \pi) u \left(b, b\right)\right)\right] + \hat{\kappa} u_2(h) + (1 - \hat{\kappa}) u_2(\ell),$$

where  $\hat{\kappa}$  denotes the second-period officeholder's expected ability.

In this case, the second-period officeholder's expected ability equals:

$$\hat{\kappa} = q_i \left[ \kappa + (1 - \kappa) \gamma \right] + (1 - q_i) \max \left\{ \kappa, \gamma \right\}.$$

In general, when the Incumbent's type is not revealed before the election, the secondperiod officeholder's expected ability is defined as follows:

$$[\kappa\pi + (1-\kappa)\sigma] \max \{\kappa^{a}, \gamma\} + [\kappa(1-\pi) + (1-\kappa)(1-\sigma)] \max \{\kappa^{b}, \gamma\}$$

The definition of  $\hat{\kappa}$  found above takes advantage of the fact that in equilibrium, without endogenous challenger entry,  $\kappa^a \leq \gamma$  and  $\kappa^b \leq \gamma$  if  $\kappa \leq \gamma$ , and  $\kappa^a \geq \gamma$  and  $\kappa^b \geq \gamma$  otherwise. Therefore, the second-period officeholder's expected ability when the Incumbent's type is not revealed before the election simplifies to max  $\{\kappa, \gamma\}$ .

With endogenous challenger entry, the Voter's welfare equals:

$$\kappa \left[ \pi u \left( y_1 \left( h, a \right), a \right) + (1 - \pi) u \left( y_1 \left( h, b \right), b \right) \right] + (1 - \kappa) \left[ \sigma' \left( \pi u \left( a, a \right) + (1 - \pi) u \left( a, b \right) \right) + (1 - \sigma') \left( \pi u \left( b, a \right) + (1 - \pi) u \left( b, b \right) \right) \right] + \hat{\kappa}' u_2 \left( h \right) + (1 - \hat{\kappa}') u_2 \left( \ell \right),$$

where  $\sigma'$  denotes the probability that low-ability incumbents enact policy *a* in the first period and  $\hat{k}'$  the second-period officeholder's expected ability.

In this case, the second-period officeholder's expected ability equals:

$$\begin{split} \hat{\kappa}' &= \left[\kappa\pi + (1-\kappa)\,\sigma'\right] \begin{cases} \rho^a \left[q_i \left(\kappa^a + (1-\kappa^a)\,\gamma\right) + (1-q_i)\max\left\{\kappa^a,\gamma\right\}\right] \\ &+ (1-\rho^a)\,\kappa^a \end{cases} \\ + \left[\kappa\left(1-\pi\right) + (1-\kappa)\left(1-\sigma'\right)\right] \begin{cases} \rho^b \left[q_i \left(\kappa^b + \left(1-\kappa^b\right)\gamma\right) + (1-q_i)\max\left\{\kappa^b,\gamma\right\}\right] \\ &+ \left(1-\rho^b\right)\kappa^b \end{cases} \end{cases}. \end{split}$$

. . .

The difference between the Voter's welfare with and without endogenous challenger entry equals:

$$(1 - \kappa) (\sigma' - \sigma) \underbrace{\left[\pi (u (a, a) - u (b, a)) + (1 - \pi) (u (a, b) - u (b, b))\right]}_{=\pi \times 1 + (1 - \pi) \times -1 = 2\pi - 1} + (\hat{\kappa}' - \hat{\kappa}) \underbrace{\left[u_2 (h) - u_2 (\ell)\right]}_{=1 - \pi}.$$

For endogenous challenger entry to improve the Voter's welfare, this difference must be positive, which turns into the following condition:

$$(1-\kappa)\left(\sigma'-\sigma\right)\left(2\pi-1\right) \ge \left(\hat{\kappa}-\hat{\kappa}'\right)\left(1-\pi\right).$$

The left-hand side of this inequality reflects the benefits of endogenous challenger entry in terms of fewer policy distortions. On the other hand, the right-hand side represents the cost of endogenous challenger entry in terms of weaker electoral selection.

Henceforth, I consider the case wherein endogenous challenger entry mitigates policy distortions, that is, when  $\gamma > \bar{\kappa}$  and  $\kappa \in \left(\frac{\gamma \bar{\kappa}}{\pi \gamma + (1-\pi)\bar{\kappa}}, \frac{\gamma}{\gamma + (1-\gamma)\pi}\right)$ . In general, the latter interval is divided into three parts partitioned by the values  $\frac{\bar{\kappa}}{\bar{\kappa} + (1-\bar{\kappa})\pi}$  and  $\gamma$ .

I successively consider the left-hand and right-hand sides of the inequality under which endogenous challenger entry improves the Voter's welfare.

I begin by considering the left-hand side of the inequality.

If  $\kappa < \min\left\{\frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi},\gamma\right\}$ , the difference between the probability that low-ability incumbents enact policy *a* in the first period with and without endogenous challenger entry equals:

$$\sigma' - \sigma = \frac{\kappa \left(1 - \bar{\kappa}\right)\pi}{\left(1 - \kappa\right)\bar{\kappa}} - \left[1 - \frac{\kappa \left(1 - \gamma\right)\left(1 - \pi\right)}{\left(1 - \kappa\right)\gamma}\right]$$
$$= \frac{\kappa}{1 - \kappa} \left[\frac{\pi \left(1 - \bar{\kappa}\right)}{\bar{\kappa}} + \frac{\left(1 - \pi\right)\left(1 - \gamma\right)}{\gamma}\right] - 1.$$

If  $\kappa > \max\left\{\frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi},\gamma\right\}$ , the difference between the probability that low-ability incumbents enact policy *a* in the first period with and without endogenous challenger entry equals:

$$\sigma' - \sigma = 1 - \frac{\kappa \left(1 - \gamma\right) \pi}{\left(1 - \kappa\right) \gamma}.$$

There remain two cases to consider, depending on which of  $\frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}$  and  $\gamma$  is greater. When  $\gamma > \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}$ , the difference between the probability that low-ability incumbents enact policy *a* in the first period with and without endogenous challenger entry if  $\kappa \in \left(\frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}, \gamma\right)$  equals:

$$\sigma' - \sigma = 1 - \left[1 - \frac{\kappa \left(1 - \gamma\right) \left(1 - \pi\right)}{\left(1 - \kappa\right) \gamma}\right] = \frac{\kappa \left(1 - \gamma\right) \left(1 - \pi\right)}{\left(1 - \kappa\right) \gamma}$$

When  $\gamma < \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}$ , the difference between the probability that low-ability incumbents enact policy *a* in the first period with and without endogenous challenger entry if  $\kappa \in \left(\gamma, \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}\right)$  equals:

$$\sigma' - \sigma = \frac{\kappa \left(1 - \bar{\kappa}\right) \pi}{\left(1 - \kappa\right) \bar{\kappa}} - \frac{\kappa \left(1 - \gamma\right) \pi}{\left(1 - \kappa\right) \gamma} = \frac{\kappa}{1 - \kappa} \left(\frac{1 - \bar{\kappa}}{\bar{\kappa}} - \frac{1 - \gamma}{\gamma}\right) \pi$$

On the whole, the benefits of endogenous challenger entry in terms of fewer policy distortions are maximized when  $\kappa = \max \left\{ \frac{\bar{\kappa}}{\bar{\kappa} + (1-\bar{\kappa})\pi}, \gamma \right\}$ .

Next, I consider the right-hand side of the inequality.

Note that if  $\kappa \in \left(\bar{\kappa}, \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}\right)$ , the second-period officeholder's expected ability with endogenous challenger entry equals:

$$\begin{split} & [\kappa \pi + (1 - \kappa) \,\sigma] \left\{ \rho^{a} \left[ q_{i} \left( \kappa^{a} + (1 - \kappa^{a}) \,\gamma \right) + (1 - q_{i}) \,\gamma \right] + (1 - \rho^{a}) \,\kappa^{a} \right\} \\ & + \left[ \kappa \left( 1 - \pi \right) + (1 - \kappa) \left( 1 - \sigma \right) \right] \kappa^{b} \\ & = \kappa + \rho^{a} \left[ q_{i} \left( \kappa^{a} + (1 - \kappa^{a}) \,\gamma \right) + (1 - q_{i}) \,\gamma - \kappa^{a} \right] \left[ \kappa \pi + (1 - \kappa) \,\sigma \right] \\ & = \kappa + \rho^{a} \left[ q_{i} \left( 1 - \bar{\kappa} \right) \gamma + (1 - q_{i}) \left( \gamma - \bar{\kappa} \right) \right] \left[ \kappa \pi + \frac{\kappa \left( 1 - \bar{\kappa} \right) \pi}{\bar{\kappa}} \right] \\ & = \kappa \left\{ 1 + \frac{\rho^{a} \left[ q_{i} \left( 1 - \bar{\kappa} \right) \gamma + (1 - q_{i}) \left( \gamma - \bar{\kappa} \right) \right] \pi}{\bar{\kappa}} \right\}. \end{split}$$

If  $\kappa < \min\left\{\frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}, \gamma\right\}$ , the difference between the second-period officeholder's expected ability with and without endogenous challenger entry equals:

$$\hat{\kappa} - \hat{\kappa}' = \underbrace{q_i \left[\kappa + (1 - \kappa)\gamma\right] + (1 - q_i)\gamma}_{=\gamma + q_i(1 - \gamma)\kappa} - \kappa \left\{1 + \frac{\rho^a \left[q_i \left(1 - \bar{\kappa}\right)\gamma + (1 - q_i)\left(\gamma - \bar{\kappa}\right)\right]\pi}{\bar{\kappa}}\right\}.$$

If  $\kappa > \max\left\{\frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi},\gamma\right\}$ , the difference between the second-period officeholder's expected ability with and without endogenous challenger entry equals:

$$\hat{\kappa} - \hat{\kappa}' = q_i \left[\kappa + (1 - \kappa)\gamma\right] + (1 - q_i)\kappa - \kappa = q_i (1 - \kappa)\gamma.$$

When  $\gamma > \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}$ , the difference between the second-period officeholder's expected ability with and without endogenous challenger entry if  $\kappa \in \left(\frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi},\gamma\right)$  equals:

$$\hat{\kappa} - \hat{\kappa}' = q_i \left[\kappa + (1 - \kappa)\gamma\right] + (1 - q_i)\gamma - \kappa = \gamma - \left[1 - q_i \left(1 - \gamma\right)\right]\kappa.$$

When  $\gamma < \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}$ , the difference between the second-period officeholder's expected ability with and without endogenous challenger entry if  $\kappa \in \left(\gamma, \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}\right)$  equals:

$$\begin{aligned} \hat{\kappa} - \hat{\kappa}' &= q_i \left[ \kappa + (1 - \kappa) \gamma \right] + (1 - q_i) \kappa - \kappa \left\{ 1 + \frac{\rho^a \left[ q_i \left( 1 - \bar{\kappa} \right) \gamma + (1 - q_i) \left( \gamma - \bar{\kappa} \right) \right] \pi}{\bar{\kappa}} \right\} \\ &= q_i \left( 1 - \kappa \right) \gamma - \frac{\rho^a \left[ q_i \left( 1 - \bar{\kappa} \right) \gamma + (1 - q_i) \left( \gamma - \bar{\kappa} \right) \right] \kappa \pi}{\bar{\kappa}}. \end{aligned}$$

In all cases, the cost of weaker electoral selection induced by endogenous challenger entry decreases monotonically with  $\kappa$ .

Combined, these results imply that if endogenous challenger entry improves the Voter's welfare for some value of the Incumbent's expected ability, it must necessarily do so when the latter equals max  $\left\{\gamma, \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}\right\}$ . In other words, for endogenous challenger entry to improve the Voter's welfare, it must improve it when  $\kappa = \max\left\{\gamma, \frac{\bar{\kappa}}{\bar{\kappa}+(1-\bar{\kappa})\pi}\right\}$ . Formally, this is reflected in the following inequality:

$$\left(1 - \frac{\kappa \left(1 - \gamma\right) \pi}{\left(1 - \kappa\right) \gamma}\right) \left(2\pi - 1\right) \ge q_i \gamma \left(1 - \pi\right)$$

Evaluated at  $\kappa = \gamma$ , this condition simplifies to:

$$(1-\pi)(2\pi-1) \ge q_i \gamma (1-\pi) \Leftrightarrow 2\pi - 1 \ge q_i \gamma.$$

Evaluated at  $\kappa = \frac{\bar{\kappa}}{\bar{\kappa} + (1 - \bar{\kappa})\pi}$ , this condition simplifies to:

$$\begin{pmatrix} 1 - \frac{\bar{\kappa} (1 - \gamma)}{(1 - \bar{\kappa}) \gamma} \end{pmatrix} (2\pi - 1) \ge q_i \gamma (1 - \pi)$$

$$\Leftrightarrow (\gamma - \bar{\kappa}) (2\pi - 1) \ge q_i (1 - \bar{\kappa}) \gamma^2 (1 - \pi)$$

$$\Leftrightarrow [q_i \gamma - (1 - c)] (2\pi - 1) \ge q_i [q_i - (1 - c)] \gamma^2 (1 - \pi)$$

### Appendix D

# SUPPLEMENTARY MATERIAL FOR CHAPTER 4

### **D.1** Definition of the Equilibrium Concept

Definition D.1. An equilibrium is defined as a set of strategies and beliefs

$$\left\langle \sigma_{s}^{\circ}, \sigma_{w}^{\circ}, \sigma_{s}^{s=a}, \sigma_{s}^{s=b}, \sigma_{w}^{s=a}, \sigma_{w}^{s=b}, \tilde{\sigma}_{s}^{s=a}, \tilde{\sigma}_{s}^{s=b}, \tilde{\sigma}_{w}^{s=a}, \tilde{\sigma}_{w}^{s=b}, \nu^{\circ}, \nu^{a}, \nu^{b}, \kappa^{\circ}, \hat{\kappa}, \kappa^{a}, \kappa^{b} \right\rangle$$

that satisfy the following conditions:

(i) Candidates' election-stage announcements are sequentially rational:

$$P_{\sigma^{\circ},\nu^{\circ}} (Elected|Pledge) E_{\tilde{\sigma}_{\theta}} \left[ u_{p} \middle| \theta_{j} = \theta \right] > (<) P_{\sigma^{\circ},\nu^{\circ}} (Elected|Not Pledge) \\ \left\{ E_{\sigma_{\theta}} \left[ u_{p} \middle| \theta_{j} = \theta \right] + \delta P_{\sigma_{\theta},\nu^{a},\nu^{b}} (Re\text{-}Elected) E_{\tilde{\sigma}_{\theta}} \left[ u_{p} \middle| \theta_{j} = \theta \right] \right\} \Longrightarrow \sigma_{\theta}^{\circ} = 1 (0);$$

(ii) The Voter's choice at the election stage is sequentially rational:

$$\kappa^{\circ} E_{\tilde{\sigma}_{s}} [u_{v}] + (1 - \kappa^{\circ}) E_{\tilde{\sigma}_{w}} [u_{v}] + \gamma E_{\tilde{\sigma}_{s}} [u_{v}] + (1 - \gamma) E_{\tilde{\sigma}_{w}} [u_{v}] > (<)$$
  
$$\hat{\kappa} E_{\sigma_{s}} [u_{v}] + (1 - \hat{\kappa}) E_{\sigma_{w}} [u_{v}] + \hat{\gamma} E_{\tilde{\sigma}_{s}} [u_{v}] + (1 - \hat{\gamma}) E_{\tilde{\sigma}_{w}} [u_{v}] \Rightarrow v^{\circ} = 1 (0),$$

where

$$\begin{split} \hat{\gamma} &= P_{\sigma} \left( y_{1} = a \right) \int_{0}^{1} \left[ v^{a} \left( \tilde{\gamma} \right) \ \kappa^{a} + \left( 1 - v^{a} \left( \tilde{\gamma} \right) \right) \tilde{\gamma} \right] dF \left( \tilde{\gamma} \right) \\ &+ P_{\sigma} \left( y_{1} = b \right) \int_{0}^{1} \left[ v^{b} \left( \tilde{\gamma} \right) \ \kappa^{b} + \left( 1 - v^{b} \left( \tilde{\gamma} \right) \right) \tilde{\gamma} \right] dF \left( \tilde{\gamma} \right) \end{split}$$

denotes the officeholder's average ability in period 2 conditional on the Incumbent not having pledged to term limits at the election stage;

(iii) Conditional on not having pledged to term limits at the election stage, the Incumbent's policy decisions in period 1 are sequentially rational given her private signal:

$$\begin{aligned} \pi_{\theta}^{s=x} \, u_p \left( a, a, \theta \right) + \left( 1 - \pi_{\theta}^{s=x} \right) u_p \left( a, b, \theta \right) + \delta \bar{v}^a \, E_{\tilde{\sigma}_{\theta}} \left[ u_p \middle| \theta_i = \theta \right] > (<) \\ \pi_{\theta}^{s=x} \, u_p \left( b, a, \theta \right) + \left( 1 - \pi_{\theta}^{s=x} \right) u_p \left( b, b, \theta \right) + \delta \bar{v}^b \, E_{\tilde{\sigma}_{\theta}} \left[ u_p \middle| \theta_i = \theta \right] \Rightarrow \sigma_{\theta}^{s=x} = 1 \left( 0 \right), \end{aligned}$$

where

$$\pi_{\theta}^{s=x} = P\left(\omega_t = a \middle| s_t = x, \theta_j = \theta\right) = \begin{cases} \frac{\pi q_{\theta}}{\pi q_{\theta} + (1-\pi)(1-q_{\theta})} & \text{if } x = a \\ \frac{\pi (1-q_{\theta})}{\pi (1-q_{\theta}) + (1-\pi)q_{\theta}} & \text{if } x = b \end{cases}$$

denotes the posterior probability that the state equals a conditional on having observed signal  $x \in S$  if he or she has type  $\theta_j = \theta$ , and

$$\bar{\nu}^{y} = E\left[\nu^{y}\left(\tilde{\gamma}\right)\right]$$

denotes the Incumbent's expected reelection probability after carrying out policy y;

 (iv) Conditional on the Incumbent not having pledged to term limits at the election stage, the Voter's electoral behavior in period 2 is sequentially rational given the Challenger's posterior probability of being strong:

$$\kappa^{y} > (<) \,\tilde{\gamma} \Longrightarrow \nu^{y} \,(\tilde{\gamma}) = 1 \,(0) \,;$$

(v) The policy decisions taken by the officeholder in period 2 are sequentially rational given his or her private signal:

$$\begin{aligned} \pi_{\theta}^{s=x} u_p \left( a, a, \theta \right) + \left( 1 - \pi_{\theta}^{s=x} \right) u_p \left( a, b, \theta \right) \\ > \left( < \right) \pi_{\theta}^{s=x} u_p \left( b, a, \theta \right) + \left( 1 - \pi_{\theta}^{s=x} \right) u_p \left( b, b, \theta \right) \Rightarrow \tilde{\sigma}_{\theta}^{s=x} = 1 \left( 0 \right); \end{aligned}$$

- (vi) The Voter's posterior beliefs about the first-period candidates' and the Incumbent's strength conditional on their observable actions are computed using Bayes' Rule on the equilibrium path; and
- (vii) The Voter's off-the-equilibrium-path beliefs satisfy the D1 Criterion.

Note that point (iv) readily implies that:

$$\bar{\nu}^{y} = P\left(\kappa^{y} \ge \tilde{\gamma}\right) = F\left(\kappa^{y}\right),$$

and

$$\hat{\gamma} = P_{\sigma} (y_1 = a) E \left[ \max \left\{ \kappa^a, \tilde{\gamma} \right\} \right] + P_{\sigma} (y_1 = b) E \left[ \max \left\{ \kappa^b, \tilde{\gamma} \right\} \right].$$
## **Equilibrium Refinement**

In this section, I discuss how the D1 Criterion influences off-the-equilibrium-path beliefs. I do so specifically for the Voter's posterior beliefs about the Incumbent's type in period 2.

Consider an equilibrium wherein the Incumbent carries out policy  $y \in Y$  in the presence of career concerns regardless of her type and the signal she observes. In such an equilibrium, we have  $\kappa^y = \hat{\kappa}$ . Policy  $y' \neq y$  is out of the equilibrium path. Accordingly, the posterior probability that the Incumbent is strong conditional on having carried out policy y' is left to the analyst's discretion. Nonetheless, sequential rationality of the Incumbent's policy decisions entails that we must have  $\bar{\nu}^y > \bar{\nu}^{y'}$  and, by extension,  $\kappa^y > \kappa^{y'}$ , otherwise it would not be sequentially rational for the Incumbent to pool on policy y.

Let  $\mathcal{D}(\theta, x)$  denote the set of the Voter's best responses to some posterior beliefs  $\kappa^{y'} \in [0, 1]$  for which a type  $\theta$  incumbent is willing to deviate to policy y' upon observing signal x:

$$\mathcal{D}\left(\theta,x\right) = \left\{ \kappa \in \left[0,1\right]: \begin{array}{c} \pi_{\theta}^{s=x} u_{p}\left(y,a,\theta\right) + \left(1 - \pi_{\theta}^{s=x}\right) u_{p}\left(y,b,\theta\right) + \delta F\left(\hat{\kappa}\right) \beta_{\theta} \\ < \pi_{\theta}^{s=x} u_{p}\left(y',a,\theta\right) + \left(1 - \pi_{\theta}^{s=x}\right) u_{p}\left(y',b,\theta\right) + \delta F\left(\kappa\right) \beta_{\theta} \end{array} \right\},$$

where  $\beta_{\theta}$  denotes the benefits a type  $\theta$  politician reaps from holding office in period 2.

The D1 Criterion stipulates that if there is a type  $\theta \in \Theta$  and signal *x* such that:

$$\mathcal{D}\left(\theta',a\right)\cup\mathcal{D}\left(\theta',b\right)\subsetneq\mathcal{D}\left(\theta,x\right)$$

for  $\theta' \neq \theta$ , the Voter's posterior beliefs must attribute a probability of one to the event that the Incumbent has type  $\theta$  conditional on having deviated and carried out policy y' in period 1. Consequently, if such a type  $\theta$  exists, the value of  $\kappa^{y'}$  must be defined as follows:

$$\kappa^{y'} = \begin{cases} 1 & \text{if } \theta = s \\ 0 & \text{if } \theta = w. \end{cases}$$

In light of the previous observation that we must have  $\kappa^y > \kappa^{y'}$  in equilibrium, a pooling equilibrium survives the D1 Criterion only if there does not exist some signal x such that:

$$\mathcal{D}(w,a) \cup \mathcal{D}(w,b) \subsetneq \mathcal{D}(s,x),$$

as the D1 Criterion would otherwise prescribe that  $\kappa^{y'} = 1 \ge \kappa^{y}$ , a contradiction with the sequential rationality of the Incumbent's policy decisions.

## **D.2 Proof of Proposition 4.1**

*Proof.* For separation to occur, one type of candidate must pledge to term limits with strictly positive probability.

By behaving according to the same strategy in period 1, the Incumbent can achieve at least the same payoffs upon being elected if she is eligible for reelection than if she forgoes reelection:

$$E_{\boldsymbol{\sigma}_{\theta}}\left[u_{p}\middle|\theta_{j}=\theta\right]+\delta P_{\boldsymbol{\sigma}_{\theta},v^{a},v^{b}} \text{ (Re-Elected) } E_{\tilde{\boldsymbol{\sigma}}_{\theta}}\left[u_{p}\middle|\theta_{j}=\theta\right]\geq E_{\tilde{\boldsymbol{\sigma}}_{\theta}}\left[u_{p}\middle|\theta_{j}=\theta\right].$$

Accordingly, the Incumbent's expected payoffs in the absence of career concerns constitute her reservation value.

It follows that for a candidate to find it sequentially rational to pledge to term limits, he must have a higher probability of being elected after doing so:

$$P_{\sigma^{\circ},\nu^{\circ}}$$
 (Elected | Pledge)  $\geq P_{\sigma^{\circ},\nu^{\circ}}$  (Elected | Not Pledge)

The probability that a candidate who has pledged to term limits will be elected equals:

$$P_{\sigma^{\circ},\nu^{\circ}} (\text{Elected}|\text{Pledge}) = \left[\kappa \sigma_{s}^{\circ} + (1-\kappa) \sigma_{w}^{\circ}\right] \times \frac{1}{2} + \left[\kappa \left(1 - \sigma_{s}^{\circ}\right) + (1-\kappa) \left(1 - \sigma_{w}^{\circ}\right)\right] \nu^{\circ}.$$

The probability that a candidate who has not pledged to term limits will be elected equals:

$$P_{\sigma^{\circ},\nu^{\circ}} \text{ (Elected|Not Pledge)} = \left[\kappa \sigma_{s}^{\circ} + (1-\kappa) \sigma_{w}^{\circ}\right] (1-\nu^{\circ}) \\ + \left[\kappa \left(1-\sigma_{s}^{\circ}\right) + (1-\kappa) \left(1-\sigma_{w}^{\circ}\right)\right] \times \frac{1}{2}.$$

Elementary algebraic manipulations suffice to show that a candidate has a higher probability of being elected after pledging to term limits if and only if the Voter elects with higher probability a candidate who has pledged to term limits against a candidate who has not:

$$P_{\sigma^{\circ},\nu^{\circ}}$$
 (Elected|Pledge)  $\geq P_{\sigma^{\circ},\nu^{\circ}}$  (Elected|Not Pledge)  $\Leftrightarrow \nu^{\circ} \geq \frac{1}{2}$ .

.

#### **D.3 Proof of Proposition 4.2**

*Proof.* I prove this proposition by way of contradiction.

On the one hand, if a reelection-eligible candidate were known to be weak, the Voter would prefer to elect a candidate who had pledged to term limits against one who had not in period 1:

$$\kappa^{\circ} E_{\tilde{\sigma}_{s}} [u_{v}] + (1 - \kappa^{\circ}) E_{\tilde{\sigma}_{w}} [u_{v}] > E_{\tilde{\sigma}_{w}} [u_{v}].$$

Further, the Voter would necessarily replace the reelection-eligible Incumbent with the Challenger in period 2:

$$\kappa^{\circ} E_{\tilde{\sigma}_{s}} [u_{v}] + (1 - \kappa^{\circ}) E_{\tilde{\sigma}_{w}} [u_{v}] > E_{\tilde{\sigma}_{w}} [u_{v}]$$

Accordingly, the Voter would replace the Incumbent with the Challenger no matter the former's election-stage announcement. In this case, term limits pledges become a costless message. Since candidates who pledge to term limits have a higher probability of being elected, all candidates find it strictly beneficial to pledge to term limits. This contradicts the fact that partial separation is achieved in equilibrium.

On the other hand, if a reelection-eligible candidate were known to be strong, the Voter would strictly prefer to elect such a candidate against one who had pledged to term limits in period 1:

$$\kappa^{\circ} E_{\tilde{\sigma}_{s}}\left[u_{v}\right] + (1-\kappa^{\circ}) E_{\tilde{\sigma}_{w}}\left[u_{v}\right] + \gamma E_{\tilde{\sigma}_{s}}\left[u_{v}\right] + (1-\gamma) E_{\tilde{\sigma}_{w}}\left[u_{v}\right] < 2 \times E_{\tilde{\sigma}_{s}}\left[u_{v}\right].$$

This contradicts Proposition 1, which states that separation is possible only if the Voter is willing to elect a candidate who has pledged to term limits against one who has not.  $\Box$ 

## D.4 Proof of Proposition 4.3

*Proof.* In partially separating equilibria, the Voter must be indifferent between electing a candidate who has pledged to term limits and one who has not:

 $E_{\tilde{\sigma}_{w}}[u_{v}] + \gamma E_{\tilde{\sigma}_{s}}[u_{v}] + (1 - \gamma) E_{\tilde{\sigma}_{w}}[u_{v}]$ 

Welfare from electing a weak candidate who has pledged to term limits

$$= \hat{\kappa} E_{\sigma_s} \left[ u_v \right] + (1 - \hat{\kappa}) E_{\sigma_w} \left[ u_v \right] + \hat{\gamma} E_{\tilde{\sigma}_s} \left[ u_v \right] + (1 - \hat{\gamma}) E_{\tilde{\sigma}_w} \left[ u_v \right].$$

Welfare from electing a candidate who has not pledged to term limits

The officeholder's expected ability and, coincidentally, the Voter's welfare in period 2 is greater when the Incumbent is eligible for reelection:

$$\gamma E_{\tilde{\sigma}_s} \left[ u_v \right] + (1 - \gamma) E_{\tilde{\sigma}_w} \left[ u_v \right] < \hat{\gamma} E_{\tilde{\sigma}_s} \left[ u_v \right] + (1 - \hat{\gamma}) E_{\tilde{\sigma}_w} \left[ u_v \right].$$

Accordingly, the identity above holds if a weak candidate who has pledged to term limits provides greater policy payoffs in period 1 than a candidate who has not pledged to term limits:

$$E_{\tilde{\sigma}_{w}}[u_{v}] > \hat{\kappa} E_{\sigma_{s}}[u_{v}] + (1-\hat{\kappa}) E_{\sigma_{w}}[u_{v}].$$

# **D.5 Proof of Proposition 4.4**

*Proof.* In partially separating equilibria, the Voter must be indifferent between electing a candidate who has pledged to term limits and one who has not:

 $\underbrace{E_{\tilde{\sigma}_{w}}\left[u_{v}\right] + \gamma E_{\tilde{\sigma}_{s}}\left[u_{v}\right] + (1 - \gamma) E_{\tilde{\sigma}_{w}}\left[u_{v}\right]}_{\text{Welfare from electing a strong candidate who has pledged to term limits}} = \hat{\kappa} E_{\sigma_{s}}\left[u_{v}\right] + (1 - \hat{\kappa}) E_{\sigma_{w}}\left[u_{v}\right] + \hat{\gamma} E_{\tilde{\sigma}_{s}}\left[u_{v}\right] + (1 - \hat{\gamma}) E_{\tilde{\sigma}_{w}}\left[u_{v}\right].$ 

Welfare from electing a candidate who has not pledged to term limits

The officeholder's expected ability and, coincidentally, the Voter's welfare in period 2 is greater when the Incumbent is eligible for reelection:

$$\gamma E_{\tilde{\sigma}_s} \left[ u_v \right] + (1 - \gamma) E_{\tilde{\sigma}_w} \left[ u_v \right] < \hat{\gamma} E_{\tilde{\sigma}_s} \left[ u_v \right] + (1 - \hat{\gamma}) E_{\tilde{\sigma}_w} \left[ u_v \right].$$

Accordingly, the identity above holds if a strong candidate who has pledged to term limits provides greater policy payoffs in period 1 than a candidate who has not pledged to term limits:

$$E_{\tilde{\sigma}_s}[u_v] > \hat{\kappa} E_{\sigma_s}[u_v] + (1 - \hat{\kappa}) E_{\sigma_w}[u_v].$$

### **D.6 Proof of Proposition 4.5**

*Proof.* Sequential rationality of strong candidates' election-stage announcements entails that they must be indifferent between both possible announcements:

$$\frac{P_{\sigma^{\circ},\nu^{\circ}} \text{ (Elected |Pledge)}}{P_{\sigma^{\circ},\nu^{\circ}} \text{ (Elected |Not Pledge)}} = \frac{E_{\sigma_{s}} \left[ u_{p} \middle| \theta_{j} = s \right] + \delta P_{\sigma_{s},\nu^{a},\nu^{b}} \text{ (Re-Elected)} E_{\tilde{\sigma}_{s}} \left[ u_{p} \middle| \theta_{j} = s \right]}{E_{\tilde{\sigma}_{s}} \left[ u_{p} \middle| \theta_{j} = s \right]}. \quad (D.1)$$

Analogously, sequential rationality of weak candidates' election-stage announcements requires that they weakly prefer not to pledge to term limits:

$$\frac{P_{\sigma^{\circ},v^{\circ}} \text{ (Elected | Pledge)}}{P_{\sigma^{\circ},v^{\circ}} \text{ (Elected | Not Pledge)}} \leq \frac{E_{\sigma_{w}} \left[ u_{p} \middle| \theta_{j} = w \right] + \delta P_{\sigma_{w},v^{a},v^{b}} \text{ (Re-Elected) } E_{\tilde{\sigma}_{w}} \left[ u_{p} \middle| \theta_{j} = w \right]}{E_{\tilde{\sigma}_{w}} \left[ u_{p} \middle| \theta_{j} = w \right]}. \quad (D.2)$$

In equilibrium, conditional on not having pledged to term limits at the election stage and being eligible for reelection, strong candidates are more likely to be reelected than weak candidates. Indeed, through elementary algebraic manipulations, one may show that:

$$\underbrace{\underbrace{P_{\sigma_{s},\nu^{a},\nu^{b}}\left(\text{Re-Elected}\right)}_{=\sigma_{s}\bar{\nu}^{a}+(1-\sigma_{s})\bar{\nu}^{b}} \geq \underbrace{\underbrace{P_{\sigma_{w},\nu^{a},\nu^{b}}\left(\text{Re-Elected}\right)}_{=\sigma_{w}\bar{\nu}^{a}+(1-\sigma_{w})\bar{\nu}^{b}} \Leftrightarrow \left(\sigma_{s}-\sigma_{w}\right)\left(F\left(\kappa^{a}\right)-F\left(\kappa^{b}\right)\right) \geq 0, \quad (D.3)$$

where

$$\sigma_{\theta} = P\left(s_1 = a | \theta_i = \theta\right) \sigma_{\theta}^{s=a} + P\left(s_1 = b | \theta_i = \theta\right) \sigma_{\theta}^{s=b}$$

denotes the probability that the Incumbent carries out policy *a* in period 1 if she has type  $\theta \in \Theta$ .

If both decisions are on the equilibrium path, that is, if  $\hat{\kappa}\sigma_s + (1 - \hat{\kappa})\sigma_w > 0$  and  $\hat{\kappa}(1 - \sigma_s) + (1 - \hat{\kappa})(1 - \sigma_w) > 0$ , then we must have:

$$\kappa^{a} > \kappa^{b} \Leftrightarrow \frac{\hat{\kappa}\sigma_{s}}{\hat{\kappa}\sigma_{s} + (1 - \hat{\kappa})\sigma_{w}} > \frac{\hat{\kappa}(1 - \sigma_{s})}{\hat{\kappa}(1 - \sigma_{s}) + (1 - \hat{\kappa})(1 - \sigma_{w})} \Leftrightarrow \sigma_{s} > \sigma_{w}.$$

Since *F* is a cumulative distribution function, it is weakly increasing. It follows that  $F(\kappa^a) \ge F(\kappa^b)$  whenever  $\sigma_s > \sigma_w$ , and  $F(\kappa^a) \le F(\kappa^b)$  whenever  $\sigma_s < \sigma_w$ .

In contrast, if one of the policies is off the equilibrium path, we necessarily have  $\sigma_s = \sigma_w$ .

In either case, Equation (D.3) holds, and the desired result ensues.

It follows that sequential rationality of candidates' election-stage announcements as encapsulated by Equations (D.1) and (D.2) is possible only if the following holds:

$$\frac{E_{\sigma_s}\left[u_p \middle| \theta_j = s\right]}{E_{\tilde{\sigma}_s}\left[u_p \middle| \theta_j = s\right]} \leq \frac{E_{\sigma_w}\left[u_p \middle| \theta_j = w\right]}{E_{\tilde{\sigma}_w}\left[u_p \middle| \theta_j = w\right]}.$$

## **D.7 Proof of Proposition 4.6**

*Proof.* In partially separating equilibria, the Voter is indifferent between electing a candidate who has pledged to term limits and one who has not. Accordingly, the Voter's equilibrium welfare equals the payoffs they reap from electing a candidate with expected strength  $\hat{\kappa}$  who has not pledged to term limits:

$$\hat{\kappa} E_{\sigma_{s}(\hat{\kappa})} \left[ u_{v} \right] + (1 - \hat{\kappa}) E_{\sigma_{w}(\hat{\kappa})} \left[ u_{v} \right] + \hat{\gamma} \left( \hat{\kappa} \right) E_{\tilde{\sigma}_{s}} \left[ u_{v} \right] + (1 - \hat{\gamma} \left( \hat{\kappa} \right)) E_{\tilde{\sigma}_{w}} \left[ u_{v} \right],$$

where  $\hat{\gamma}(k)$  denotes the officeholder's expected strength in period 2 conditional on the Incumbent (with expected strength k) not having pledged to term limits.

To determine whether partial separation improves the Voter's welfare, we must compare the payoffs they reap from electing a candidate with average ability  $\hat{k}$  to the payoffs they reap from electing a randomly drawn contestant from the pool of first-period candidates. Accordingly, partial separation improves the Voter's welfare if and only if the following holds:

$$\underbrace{\hat{\kappa}\left(E_{\sigma_{s}(\hat{\kappa})}\left[u_{\nu}\right]-E_{\sigma_{s}(\kappa)}\left[u_{\nu}\right]\right)+\left(1-\hat{\kappa}\right)\left(E_{\sigma_{w}(\hat{\kappa})}\left[u_{\nu}\right]-E_{\sigma_{w}(\kappa)}\left[u_{\nu}\right]\right)}_{\text{Behavior}} \geq \underbrace{\left(\kappa-\hat{\kappa}\right)\left(E_{\sigma_{s}(\kappa)}\left[u_{\nu}\right]-E_{\sigma_{w}(\kappa)}\left[u_{\nu}\right]\right)+\left(\hat{\gamma}\left(\kappa\right)-\hat{\gamma}\left(\hat{\kappa}\right)\right)\left(E_{\tilde{\sigma}_{s}}\left[u_{\nu}\right]-E_{\tilde{\sigma}_{w}}\left[u_{\nu}\right]\right)}_{\text{Strength}}.$$

$$\underbrace{\left(D.4\right)}$$

In equilibria where strong politicians forgo reelection with strictly positive probability, the strength channel's effects are necessarily detrimental since the expected ability of candidates who have not pledged to term limits is lower than first-period candidates' average ability:

$$\kappa > \hat{\kappa} \text{ and } \hat{\gamma}(\kappa) > \hat{\gamma}(\hat{\kappa}) \Longrightarrow (\kappa - \hat{\kappa}) \left( E_{\sigma_s(\kappa)} \left[ u_v \right] - E_{\sigma_w(\kappa)} \left[ u_v \right] \right) + \left( \hat{\gamma}(\kappa) - \hat{\gamma}(\hat{\kappa}) \right) \left( E_{\tilde{\sigma}_s} \left[ u_v \right] - E_{\tilde{\sigma}_w} \left[ u_v \right] \right) > 0.$$

Accordingly, Equation (D.4) can hold only if its right-hand side is positive.  $\Box$ 

# **D.8** Application to Electoral Competition between Congruent and Non-Congruent Politicians

#### **Equilibrium Characterization**

Let  $\tilde{\kappa}^{y}$  denote the posterior probability that the Incumbent is strong conditional on having carried out policy *y* in the absence of career concerns:

$$\tilde{\kappa}^{y} = \begin{cases} \frac{\hat{\kappa}\tilde{\sigma}_{s}}{\hat{\kappa}\tilde{\sigma}_{s} + (1-\hat{\kappa})\tilde{\sigma}_{w}} & \text{if } y = a \\ \frac{\hat{\kappa}(1-\tilde{\sigma}_{s})}{\hat{\kappa}(1-\tilde{\sigma}_{s}) + (1-\hat{\kappa})(1-\tilde{\sigma}_{w})} & \text{if } y = b, \end{cases}$$

where

$$\tilde{\sigma}_{\theta} = P(s_t = a) \tilde{\sigma}_{\theta}^{s=a} + P(s_t = b) \tilde{\sigma}_{\theta}^{s=b} = \begin{cases} P(s_t = a) & \text{if } \theta = s \\ P(s_t = b) & \text{if } \theta = w \end{cases}$$

denotes the probability that a type  $\theta$  politician carries out policy *a* in the absence of career concerns.

Under the assumption that  $\pi > \frac{1}{2}$ , we have:

$$P(s_t = a) = \pi q + (1 - \pi) (1 - q) > \pi (1 - q) + (1 - \pi) q = P(s_t = b).$$

Therefore, in the absence of career concerns, the Incumbent is more likely to carry out policy *a* if she is strong:

$$\tilde{\sigma}_a > \tilde{\sigma}_b.$$

Accordingly, the Incumbent is more likely to be strong in the absence of career concerns after carrying out policy *a* than after carrying out policy *b*:

$$\tilde{\kappa}^a > \tilde{\kappa}^b$$
.

**Proposition D.1.** The model's equilibria are as follows:

• *If* 

$$\min \left\{ \begin{array}{l} \pi^{s=b} \left( u_p \left( b, a, s \right) - u_p \left( a, a, s \right) \right) \\ + \left( 1 - \pi^{s=b} \right) \left( u_p \left( b, b, s \right) - u_p \left( a, b, s \right) \right), \\ \pi^{s=a} \left( u_p \left( b, a, w \right) - u_p \left( a, a, w \right) \right) \\ + \left( 1 - \pi^{s=a} \right) \left( u_p \left( b, b, w \right) - u_p \left( a, b, w \right) \right) \end{array} \right\} > \delta \left( \tilde{\kappa}^a - \tilde{\kappa}^b \right) \beta,$$

then there exists a truthful equilibrium in which the Incumbent carries out her myopically optimal policy:

$$\sigma_s^{s=a} = \sigma_w^{s=b} = 1 \text{ and } \sigma_s^{s=b} = \sigma_w^{s=a} = 0;$$

• If  $\pi^{s=a} - \bar{\pi} < \bar{\pi} - \pi^{s=b}$ :

– If

$$\begin{split} \pi^{s=a} \left( u_p\left(a,a,s\right) - u_p\left(b,a,s\right) \right) \\ &+ \left(1 - \pi^{s=a}\right) \left( u_p\left(a,b,s\right) - u_p\left(b,b,s\right) \right) < \frac{\delta \hat{\kappa} \beta}{\hat{\kappa} + \left(1 - \hat{\kappa}\right) \left(1 - \tilde{\sigma}_w\right)}, \end{split}$$

then there exists an equilibrium in which the Incumbent distorts her decisions toward policy b if and only if she is strong:

$$\sigma_s^{s=a} \in (0,1), \sigma_s^{s=b} = \sigma_w^{s=a} = 0 \text{ and } \sigma_w^{s=b} = 1;$$

– If

$$\begin{aligned} \pi^{s=a} \left( u_p\left(b,a,w\right) - u_p\left(a,a,w\right) \right) \\ &+ \left(1 - \pi^{s=a}\right) \left( u_p\left(b,b,w\right) - u_p\left(a,b,w\right) \right) < \delta \left( \tilde{\kappa}^a - \tilde{\kappa}^b \right) \beta, \end{aligned}$$

then there exists an equilibrium in which the Incumbent distorts her decisions toward policy a if and only if she is weak:

$$\sigma_s^{s=a} = \sigma_w^{s=b} = 1, \sigma_s^{s=b} = 0 \text{ and } \sigma_w^{s=a} \in (0,1);$$

– If

$$\pi^{s=b} \left( u_p \left( a, a, w \right) - u_p \left( b, a, w \right) \right)$$
  
 
$$+ \left( 1 - \pi^{s=b} \right) \left( u_p \left( a, b, w \right) - u_p \left( b, b, w \right) \right) \in \left( \delta \hat{\kappa} \beta, \frac{\delta \hat{\kappa} \beta}{\hat{\kappa} + (1 - \hat{\kappa}) \left( 1 - \tilde{\sigma}_w \right)} \right),$$

then there exists an equilibrium in which the Incumbent carries policy b no matter the signal she observes if she is strong and distorts her decisions toward policy b if she is weak:

$$\sigma_s^{s=a} = \sigma_s^{s=b} = \sigma_w^{s=a} = 0 \text{ and } \sigma_w^{s=b} \in (0,1);$$

– *If* 

$$\begin{split} \pi^{s=a} \left( u_p\left(b,a,w\right) - u_p\left(a,a,w\right) \right) \\ &+ \left(1 - \pi^{s=a}\right) \left( u_p\left(b,b,w\right) - u_p\left(a,b,w\right) \right) < \delta \hat{\kappa} \beta, \end{split}$$

then there exists an equilibrium in which the Incumbent carries out policy a no matter her type and the signal she observes:

$$\sigma_s^{s=a} = \sigma_s^{s=b} = \sigma_w^{s=a} = \sigma_w^{s=b} = 1;$$
• If  $\pi^{s=a} - \bar{\pi} > \bar{\pi} - \pi^{s=b}$ :
- If
$$\pi^{s=b} \left( u_p \left( b, a, s \right) - u_p \left( a, a, s \right) \right)$$
+ $\left( 1 - \pi^{s=b} \right) \left( u_p \left( b, b, s \right) - u_p \left( a, b, s \right) \right) \in \left( \delta \left( \tilde{\kappa}^a - \tilde{\kappa}^b \right) \beta, \frac{\delta \hat{\kappa} \beta}{\hat{\kappa} + (1 - \hat{\kappa}) \, \tilde{\sigma}_w} \right)$ 

c = a

then there exists an equilibrium in which the Incumbent distorts her decisions toward policy a if and only if she is strong:

$$\sigma_s^{s=a}=\sigma_w^{s=b}=1, \sigma_s^{s=b}\in (0,1) \text{ and } \sigma_w^{s=a}=0;$$

– *If* 

$$\begin{aligned} \pi^{s=a} \left( u_p\left(b, a, w\right) - u_p\left(a, a, w\right) \right) \\ &+ \left(1 - \pi^{s=a}\right) \left( u_p\left(b, b, w\right) - u_p\left(a, b, w\right) \right) \in \left( \delta \hat{\kappa} \beta, \frac{\delta \hat{\kappa} \beta}{\hat{\kappa} + \left(1 - \hat{\kappa}\right) \tilde{\sigma}_w} \right), \end{aligned}$$

then there exists an equilibrium in which the Incumbent carries out policy a no matter the signal she observes if she is strong and distorts her decisions toward policy a if she is weak:

$$\sigma_s^{s=a} = \sigma_s^{s=b} = \sigma_w^{s=b} = 1 \text{ and } \sigma_w^{s=a} \in (0,1);$$

– If

$$\begin{aligned} \pi^{s=a} \left( u_p\left(a,a,s\right) - u_p\left(b,a,s\right) \right) \\ &+ \left(1 - \pi^{s=a}\right) \left( u_p\left(a,b,s\right) - u_p\left(b,b,s\right) \right) < \delta \hat{\kappa} \beta, \end{aligned}$$

then there exists an equilibrium in which the Incumbent carries out policy b no matter her type and the signal she observes:

$$\sigma_s^{s=a} = \sigma_s^{s=b} = \sigma_w^{s=a} = \sigma_w^{s=b} = 0.$$

## **Proof of Proposition 4.7**

*Proof.* We are concerned with equilibria in which the Incumbent distorts her decisions toward policy *b* if and only if she is strong:

$$\sigma_s^{s=a} \in (0, 1), \sigma_s^{s=b} = 0, \sigma_w^{s=a} = 0, \text{ and } \sigma_w^{s=b} = 1.$$

In such an equilibrium, the value of  $\sigma_s^{s=a}$  is set to satisfy the following:

$$\pi^{s=a} \left( u_p \left( a, a, s \right) - u_p \left( b, a, s \right) \right) + (1 - \pi^{s=a}) \left( u_p \left( a, b, s \right) - u_p \left( b, b, s \right) \right) = \\ \delta \left[ \frac{\hat{\kappa} \left( 1 - P \left( s_1 = a \right) \sigma_s^{s=a} \right)}{\hat{\kappa} \left( 1 - P \left( s_1 = a \right) \sigma_s^{s=a} \right) + (1 - \hat{\kappa}) \left( 1 - \tilde{\sigma}_w \right)} - \frac{\hat{\kappa} P \left( s_1 = a \right) \sigma_s^{s=a}}{\hat{\kappa} P \left( s_1 = a \right) \sigma_s^{s=a} + (1 - \hat{\kappa}) \tilde{\sigma}_w} \right] \beta.$$

Proposition D.1 stipulates that for an equilibrium to exist, it is necessary to have:

$$\pi^{s=a} - \bar{\pi} < \bar{\pi} - \pi^{s=b}$$

and

$$\pi^{s=a} \left( u_p(a, a, s) - u_p(b, a, s) \right) + (1 - \pi^{s=a}) \left( u_p(a, b, s) - u_p(b, b, s) \right) < \frac{\delta \hat{\kappa} \beta}{\hat{\kappa} + (1 - \hat{\kappa}) (1 - \tilde{\sigma}_w)}.$$
(D.5)

The Voter's welfare in period 1 equals:

$$\hat{k} \left\{ \begin{array}{c} \pi q \left[ \sigma_{s}^{s=a} u_{v} \left(a,a\right) + \left(1 - \sigma_{s}^{s=a}\right) u_{v} \left(b,a\right) \right] \\ + \left(1 - \pi\right) \left(1 - q\right) \left[ \sigma_{s}^{s=a} u_{v} \left(a,b\right) + \left(1 - \sigma_{s}^{s=a}\right) u_{v} \left(b,b\right) \right] \\ + \pi \left(1 - q\right) u_{v} \left(b,a\right) + \left(1 - \pi\right) q u_{v} \left(b,b\right) \\ \end{array} \right] \\ = \sigma_{s}^{s=a} E_{\tilde{\sigma}_{s}} [u_{v}] + \left(1 - \sigma_{s}^{s=a}\right) [\pi u_{v} \left(b,a\right) + \left(1 - \pi\right) \left(1 - q\right) u_{v} \left(b,b\right) \\ + \left(1 - \hat{k}\right) \underbrace{ \left\{ \begin{array}{c} \pi q u_{v} \left(b,a\right) + \left(1 - \pi\right) \left(1 - q\right) u_{v} \left(b,b\right) \\ + \pi \left(1 - q\right) u_{v} \left(a,a\right) + \left(1 - \pi\right) q u_{v} \left(a,b\right) \right\} \\ \end{array} \right\} }_{= E_{\tilde{\sigma}_{w}} [u_{v}]} \right\}$$

Analogously, the Voter's welfare in period 2 equals:

$$\hat{\gamma} E_{\tilde{\sigma}_s} [u_v] + (1 - \hat{\gamma}) E_{\tilde{\sigma}_w} [u_v].$$

The Voter's total welfare equals the sum of their welfare in both periods.

**Step 1.** I characterize the shape of the Voter's welfare with respect to  $\hat{\kappa}$ .

The derivative of the Voter's welfare in period 1 with respect to  $\hat{\kappa}$  equals:

$$\underbrace{\left[\sigma_{s}^{s=a}+\hat{\kappa}\frac{\partial\sigma_{s}^{s=a}}{\partial\hat{\kappa}}\right]}_{(\bullet)}\underbrace{\left\{\begin{array}{c}\pi q \left[u_{v}\left(a,a\right)-u_{v}\left(b,a\right)\right]\\+\left(1-\pi\right)\left(1-q\right)\left[u_{v}\left(a,b\right)-u_{v}\left(b,b\right)\right]\right\}\\ >0\\+\underbrace{\left\{\begin{array}{c}\pi\left(1-q\right)\left[u_{v}\left(b,a\right)-u_{v}\left(a,a\right)\right]\\+\left(1-\pi\right)q\left[u_{v}\left(b,b\right)-u_{v}\left(a,b\right)\right]\right\}\\ >0\end{array}\right\}}_{>0}.$$
 (D.6)

Equation (D.6) is negative if and only if the value of  $(\blacklozenge)$  is sufficiently negative.

One may show using the Implicit Function Theorem that:

$$\frac{\partial \sigma_s^{s=a}}{\partial \hat{\kappa}} = \frac{\frac{1}{\hat{\kappa}(1-\hat{\kappa})} \left[\kappa^b \left(1-\kappa^b\right) - \kappa^a \left(1-\kappa^a\right)\right]}{\frac{1}{\sigma_s^{s=a}} \kappa^b \left(1-\kappa^b\right) + \frac{P(s_1=a)}{1-P(s_1=a)\sigma_s^{s=a}} \kappa^a \left(1-\kappa^a\right)}.$$
 (D.7)

Analogously, we have:

$$\frac{\partial \kappa^b}{\partial \hat{\kappa}} = \frac{1}{P_{\sigma} \left(y_1 = a\right) \frac{1 - \hat{\kappa}}{1 - \kappa^a} + P_{\sigma} \left(y_1 = b\right) \frac{1 - \hat{\kappa}}{1 - \kappa^b}} > 0.$$
(D.8)

 $\kappa^b$  strictly increases with  $\hat{\kappa}$  and, because the difference between  $\kappa^a$  and  $\kappa^b$  is constant, so does  $\kappa^a$ . In fact, the derivative of  $\kappa^a$  with respect to  $\hat{\kappa}$  equals the derivative of  $\kappa^b$  with respect to  $\hat{\kappa}$ .

Conditional on having carried out policy a in period 1, the probability that the Incumbent is weak equals to:

$$1 - \kappa^a = \frac{(1 - \hat{\kappa})\,\tilde{\sigma}_w}{P_\sigma\,(y_1 = a)}.$$

Accordingly, the probability that the Incumbent carries out policy *a* in period 1 may be defined as follows:  $(1 - \hat{a}) =$ 

$$P_{\sigma}(y_1 = a) = \frac{(1 - \hat{\kappa})\,\tilde{\sigma}_w}{1 - \kappa^a}.$$

By taking the derivative of this expression with respect to  $\hat{\kappa}$ , we obtain:

$$\frac{\partial P_{\sigma} (y_1 = a)}{\partial \hat{\kappa}} = \underbrace{\frac{(1 - \hat{\kappa}) \,\tilde{\sigma}_w}{(1 - \kappa^a)^2}}_{>0} \left[ \frac{\partial \kappa^a}{\partial \hat{\kappa}} - \frac{1 - \kappa^a}{1 - \hat{\kappa}} \right].$$

Using Equation (D.8), one may show that:

$$\frac{\partial \kappa^a}{\partial \hat{\kappa}} - \frac{1 - \kappa^a}{1 - \hat{\kappa}} = \frac{1 - \left[P_\sigma\left(y_1 = a\right) + P_\sigma\left(y_1 = b\right)\frac{1 - \kappa^a}{1 - \kappa^b}\right]}{P_\sigma\left(y_1 = a\right)\frac{1 - \hat{\kappa}}{1 - \kappa^a} + P_\sigma\left(y_1 = b\right)\frac{1 - \hat{\kappa}}{1 - \kappa^b}} < 0.$$

Therefore, the probability that the Incumbent carries out policy *a* in period 1 strictly decreases with  $\hat{k}$ .

I now turn to the value of the term ( $\blacklozenge$ ) in Equation (D.6). Using Equation (D.7), one may show that:

$$\sigma_{s}^{s=a} + \hat{\kappa} \frac{\partial \sigma_{s}^{s=a}}{\partial \hat{\kappa}} = \underbrace{\sigma_{s}^{s=a} \frac{\hat{\kappa}}{1-\hat{\kappa}}}_{>0} \underbrace{\left\{ \frac{1-\kappa^{b}}{\kappa^{a} \left[ P_{\sigma} \left( y_{1}=a \right) \left( 1-\kappa^{b} \right) + \left( 1-P_{\sigma} \left( y_{1}=a \right) \right) \left( 1-\kappa^{a} \right) \right]}_{(\bigstar)} - 1 \right\}}_{(\bigstar)}.$$

The derivative of  $(\bigstar)$  with respect to  $\hat{\kappa}$  equals:

$$-\left[\frac{\frac{\partial \kappa^{a}}{\partial \hat{k}}}{(\kappa^{a})^{2}}\frac{1-\kappa^{b}}{P_{\sigma}\left(y_{1}=a\right)\left(1-\kappa^{b}\right)+\left(1-P_{\sigma}\left(y_{1}=a\right)\right)\left(1-\kappa^{a}\right)}\right.\\\left.+\frac{1}{\kappa^{a}}\frac{\left[\frac{\partial \kappa^{b}}{\partial \hat{k}}P_{\sigma}\left(y_{1}=b\right)+\frac{\partial P_{\sigma}\left(y_{1}=b\right)}{\partial \hat{k}}\left(1-\kappa^{b}\right)\right]\left(\kappa^{b}-\kappa^{a}\right)}{\left[P_{\sigma}\left(y_{1}=a\right)\left(1-\kappa^{b}\right)+\left(1-P_{\sigma}\left(y_{1}=a\right)\right)\left(1-\kappa^{a}\right)\right]^{2}}\right]<0.$$

It follows that  $(\bigstar)$  strictly decreases with  $\hat{\kappa}$ . Accordingly, if the value of  $(\blacklozenge)$  evaluated at  $\hat{\kappa}$  is negative, it is also negative when evaluated at any  $\kappa' > \hat{\kappa}$ .

It follows that the Voter's welfare in period 1 as a function of  $\hat{\kappa}$  strictly increases for low values of  $\hat{\kappa}$ , reaches a global maximum, and strictly decreases for high values of  $\hat{\kappa}$ .

The derivative of the Voter's welfare in period 2 with respect to  $\hat{\kappa}$  equals:

$$\frac{\partial \hat{\gamma}}{\partial \hat{\kappa}} \underbrace{\left[ E_{\tilde{\sigma}_s} \left[ u_v \right] - E_{\tilde{\sigma}_w} \left[ u_v \right] \right]}_{>0}.$$

In equilibrium,  $\hat{\gamma}$  equals:

$$\hat{\gamma} = P_{\sigma} \left( y_1 = a \right) \underbrace{E \left[ \max \left\{ \kappa^a, \tilde{\gamma} \right\} \right]}_{= \left( \kappa^a \right)^2 + \left( 1 - \kappa^a \right) \frac{\kappa^a + 1}{2}} + \left( 1 - P_{\sigma} \left( y_1 = a \right) \right) \underbrace{E \left[ \max \left\{ \kappa^b, \tilde{\gamma} \right\} \right]}_{= \left( \kappa^b \right)^2 + \left( 1 - \kappa^b \right) \frac{\kappa^b + 1}{2}}.$$

By taking the derivative of this expression with respect to  $\hat{\kappa}$ , we get:

$$\frac{\partial \hat{\gamma}}{\partial \hat{\kappa}} = \underbrace{\frac{\partial P_{\sigma}(y_{1} = a)}{\partial \hat{\kappa}}}_{<0} \underbrace{\left\{ E\left[ \max\left\{\kappa^{a}, \tilde{\gamma}\right\} \right] - E\left[ \max\left\{\kappa^{b}, \tilde{\gamma}\right\} \right] \right\}}_{<0} \\ + P_{\sigma}(y_{1} = a) \underbrace{\frac{\partial E\left[ \max\left\{\kappa^{a}, \tilde{\gamma}\right\} \right]}{\partial \kappa^{a}}}_{>0} \underbrace{\frac{\partial \kappa^{a}}{\partial \hat{\kappa}}}_{>0} \\ + (1 - P_{\sigma}(y_{1} = a)) \underbrace{\frac{\partial E\left[ \max\left\{\kappa^{b}, \tilde{\gamma}\right\} \right]}{\partial \kappa^{b}}}_{>0} \underbrace{\frac{\partial \kappa^{b}}{\partial \hat{\kappa}}}_{>0} > 0.$$

Therefore, the value of  $\hat{\gamma}$  and, by extension, the Voter's welfare in period 2 strictly increases with  $\hat{\kappa}$ .

**Step 2.** I characterize the comparative statics of the Voter's welfare with respect to  $\delta$ .

The Implicit Function Theorem implies that:

$$\frac{\partial \sigma_s^{s=a}}{\partial \delta} = \frac{\kappa^b - \kappa^a}{\delta \left[ \frac{1}{\sigma_s^{s=a}} \kappa^a \left( 1 - \kappa^a \right) + \frac{P(s_1=a)}{1 - P(s_1=a) \sigma_s^{s=a}} \kappa^b \left( 1 - \kappa^b \right) \right]} > 0.$$

The magnitude of the Incumbent's policy distortions decreases as her career concerns become stronger. Thus, for all values of  $\hat{\kappa}$ , the Voter's welfare increases with  $\delta$ .

**Step 3.** I characterize the value of the Voter's welfare at the lowest value of  $\hat{\kappa}$  for which an equilibrium exists.

At the lowest value of  $\hat{\kappa}$  for which an equilibrium exists, the Voter's welfare equals:

$$\hat{\kappa} \left[\pi u_{\nu} \left(b,a\right) + \left(1-\pi\right) u_{\nu} \left(b,b\right)\right] + \left(1-\hat{\kappa}\right) E_{\tilde{\sigma}_{w}} \left[u_{\nu}\right] + \hat{\gamma} E_{\tilde{\sigma}_{s}} \left[u_{\nu}\right] + \left(1-\hat{\gamma}\right) E_{\tilde{\sigma}_{w}} \left[u_{\nu}\right],$$

where

$$\hat{\gamma} = (1 - \hat{\kappa})\,\tilde{\sigma}_w \times \frac{1}{2} + \hat{\kappa}\kappa^b + (1 - \hat{\kappa})\,(1 - \tilde{\sigma}_w)\,\frac{\kappa^b + 1}{2}.$$

It is strictly lower than the Voter's payoffs from electing a strong candidate who has pledged to term limits if: (i) their ex-ante optimal policy is *a* (i.e., if  $\pi > \overline{\pi}$ ), or else (ii) the value of  $\hat{\kappa}$  is sufficiently low.

**Step 4.** I characterize the value of the Voter's welfare as  $\hat{\kappa}$  tends to one.

As  $\hat{\kappa}$  tends to one, the values of  $\kappa^a$  and  $\kappa^b$  are:

$$\lim_{\hat{\kappa} \to 1} \kappa^a = 1 - \underbrace{\left(\kappa^b - \kappa^a\right)}_{= \text{ Constant}} \in (0, 1) \qquad \lim_{\hat{\kappa} \to 1} \kappa^b = 1.$$

Accordingly, the Incumbent's probability of carrying out policy *a* conditional on having observed  $s_1 = a$  when she is strong tends to zero:

$$\lim_{\hat{\kappa}\to 1}\sigma_s^{s=a}=0$$

Accordingly, the Voter's welfare as  $\hat{\kappa}$  tends to one equals:

$$\pi \, u_{\nu} \, (b,a) + (1-\pi) \, u_{\nu} \, (b,b) + E_{\tilde{\sigma}_{s}} \, [u_{\nu}] \,. \tag{D.9}$$

The Voter's welfare from electing a strong candidate who has pledged to term limits equals:

$$E_{\tilde{\sigma}_{s}}[u_{v}] + \underbrace{\frac{1}{2} \times [\pi \ u_{v}(a,a) + (1-\pi) \ u_{v}(a,b)] + \frac{1}{2} \times [\pi \ u_{v}(b,a) + (1-\pi) \ u_{v}(b,b)]}_{=\frac{1}{2} \times E_{\tilde{\sigma}_{s}}[u_{v}] + \frac{1}{2} \times E_{\tilde{\sigma}_{w}}[u_{v}]}$$
(D.10)

The Voter's payoffs from electing a strong candidate who has pledged to term limits are strictly greater than their equilibrium welfare as the value of  $\hat{k}$  tends to one if and only if the value of Equation (D.10) is strictly greater than the value of Equation (D.9):

$$E_{\tilde{\sigma}_{s}}[u_{v}] + \frac{1}{2} \times [\pi u_{v}(a,a) + (1-\pi)u_{v}(a,b)] + \frac{1}{2} \times [\pi u_{v}(b,a) + (1-\pi)u_{v}(b,b)]$$
  
>  $\pi u_{v}(b,a) + (1-\pi)u_{v}(b,b) + E_{\tilde{\sigma}_{s}}[u_{v}] \Leftrightarrow \pi > \bar{\pi}.$ 

This is equivalent to policy *a* being the Voter's ex-ante optimal decision.

**Step 5.** I characterize the value of the Voter's welfare as  $\delta$  becomes arbitrarily large. For any value of  $\hat{\kappa} \in (0, 1)$ , an equilibrium necessarily exists as  $\delta$  becomes arbitrarily large (cf., Equation (D.5)). Concomitantly, the difference between the values of  $\kappa^a$  and  $\kappa^b$  tends to zero, implying that:

$$\lim_{\delta \to +\infty} \sigma_s^{s=a} = \frac{P(s_1 = b)}{P(s_1 = a)} \in (0, 1)$$

It follows that, as  $\delta$  becomes arbitrarily large, the Voter's posterior beliefs conditional on the Incumbent's observable actions equal:

$$\lim_{\delta \to +\infty} \kappa^a = \lim_{\delta \to +\infty} \kappa^b = \frac{\hat{\kappa}}{\hat{\kappa} + (1 - \hat{\kappa}) P(s_1 = a)}$$

Therefore, as  $\delta$  becomes arbitrarily large, the Voter's welfare equals:

$$\hat{\kappa} \begin{cases}
\frac{P(s_1=b)}{P(s_1=a)} \left[ \pi q \left( u_v \left( a, a \right) - u_v \left( b, a \right) \right) + (1 - \pi) \left( 1 - q \right) \left( u_v \left( a, b \right) - u_v \left( b, b \right) \right) \right] \\
+ \pi u_v \left( b, a \right) + (1 - \pi) u_v \left( b, b \right) \\
+ (1 - \hat{\kappa}) E \left[ U_v | \tilde{\sigma}_w \right] + \hat{\gamma} E \left[ U_v | \tilde{\sigma}_s \right] + (1 - \hat{\gamma}) E \left[ U_v | \tilde{\sigma}_w \right], \quad (D.11)$$

where

$$\hat{\gamma} = \left[\frac{\hat{\kappa}}{\hat{\kappa} + (1 - \hat{\kappa}) P(s_1 = a)}\right]^2 + \frac{\hat{\kappa} (1 - \hat{\kappa}) P(s_1 = a)}{2 \times [\hat{\kappa} + (1 - \hat{\kappa}) P(s_1 = a)]^2} + \frac{(1 - \hat{\kappa}) P(s_1 = a)}{2 \times [\hat{\kappa} + (1 - \hat{\kappa}) P(s_1 = a)]}.$$

Equation (D.11) is continuous in  $\hat{\kappa}$ . It follows from standard real analysis arguments that, as  $\delta$  becomes arbitrarily large, there exists a value of  $\hat{\kappa}$  sufficiently close to one for which the Voter's equilibrium welfare is strictly greater than Equations (D.9) and (D.10). Accordingly, as  $\delta$  becomes arbitrarily large and if  $\kappa$  is sufficiently close to one, there exists a value of  $\hat{\kappa}$ , with  $\hat{\kappa} < \kappa$ , that makes the Voter indifferent between electing: (i) a strong candidate who has pledged to term limits, and (ii) a candidate with expected strength  $\hat{\kappa}$  who has not pledged to term limits. In this case, an equilibrium exists.

As  $\delta$  grows arbitrarily large, the Voter's welfare declines for high values of  $\hat{\kappa}$ . Consequently, if the Voter's welfare from electing a strong candidate who has pledged to term limits is strictly greater than the Voter's equilibrium welfare as  $\hat{\kappa}$ tends to one (equivalently, if policy *a* is the Voter's ex-ante optimal choice), then the Voter's payoffs from electing a candidate with expected strength  $\kappa$  close to one who has not pledged to term limits are lower than their equilibrium welfare.