[Master Seminar Paper Title]

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Abstract

[…]

Introduction

[…]

Literature Review

Political agendas are a hierarchy of issues (Green-Pedersen and Mortensen 2010, 260), whereby issues constitute problems that are important to voters (1996 Petrocik, p. 826). Relevant actors, such as political parties, influence this hierarchy of issues. Actors put issues on their agendas that are salient to the public (Sides 2006, 407). Defining and influencing agendas is important because it determines what politics is about and is therefore a way of exercising political power (Edwards and Wood 1999, 327; Schattschneider 1975, 68).

Parties respond to each other's agendas as part of the "party system agenda" (Spoon et al. 2014, 374). This is a model that describes how political parties set the agenda in the context of issue competition (Green-Pedersen and Mortensen 2010, 257). In this model, the ongoing debate between political parties influences the "party system agenda" (Green-Pedersen and Mortensen 2010, 260), whereby parties emphasise issues that bring an advantage for themselves. However, parties also have to respond to all salient issues in the "party system agenda" at all times (Green-Pedersen and Mortensen 2010, 261), even if they are potentially damaging.

Parties with similar ideologies tend to be more responsive to each other than parties with less similar ideologies. This phenomenon, called the "party bloc effect" (Adams and Somer-Topcu 2009, 842; Green-Pedersen and Mortensen 2015, 760), is due to the ideological proximity between parties within the same bloc or party family.

What underpins this phenomenon? First, Green-Pedersen and Mortensen (2015, 750) show that parties in the same bloc share issue preferences and thus have a common interest in focusing on the same issues. Second, the authors explain that in a multiparty system, parties from the same party bloc are likely to be governmental coalition partners. In order to present themselves as a credible government alternative, parties from the same bloc need to show likeness by focusing on similar issues. Third, Adams and Somer-Topcu (2009, 828) show how an ideological spatial argument supports the "party bloc effect". The authors explain how parties that are close to each other in an ideological space, shift their policy positions when other parties in close proximity change their policy positions, as both parties, due to their ideological proximity, compete for a very similar set of voters. On the other hand, if a party that is ideologically further away shifts its policy position, the first party has no immediate reason to adjust its own position as a reaction.

When exploring how different parties within left-wing party families respond to each other's agendas regarding environmental issues, the literature presents varied results. On one hand, Abou-Chadi (2016) indicates that mainstream left-wing parties tend to de-emphasize green is-

sues, recognizing green parties as the successful owners of these environmental topics [431]. On the other hand, Spoon et al. (2014) points out that when left-wing parties do focus on environmental issues, they stand to gain electorally, which enables them to attract voters from green parties [375]. However, for these electoral benefits to materialize, certain conditions must be met: first, the environmental issue in question must be highly salient among the public, enhancing the likelihood of gaining votes through green mobilization [372]. Second, the electoral system needs to be accommodating to smaller parties [375], and third, the green party must be perceived as a significant electoral threat by left-wing parties [366].

In the next section, I develop theoretical expectations based on the framework by Spoon et al. (2014) and apply it to the Swiss case.

Theory and Hypothesis

How do political parties respond to the increased salience of environmental issues? Research shows that when environmental issues become more important to voters, political parties adjust their agendas to address these issues. Specifically, under the condition that left-wing parties consider the green parties to be an electoral threat, we expect mainstream left-wing parties to place environmental issues on the "party system agenda" through the introduction of parliamentary bills.

In order to win over green party voters, the left-wing parties will introduce parliamentary bills that are similar in content to bills proposed by the green party. By winning over these voters, left-wing parties gain an electoral advantage. This leads to the following hypothesis:

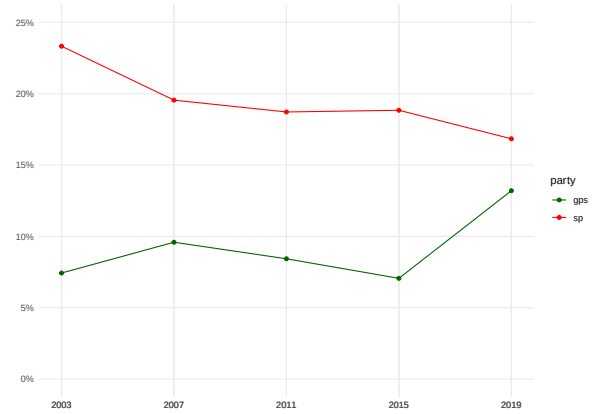
H1: An increase in the public salience of environmental issues leads to an increase in the content similarity between parliamentary bills of mainstream left-wing parties and those of green parties on environmental issues.

Applying the Hypothesis to Switzerland

In order to test this hypothesis, I turn to Switzerland. Specifically, I examine the Swiss mainstream left-wing party (Swiss Social Democrats, German: "Sozialdemokratische Partei der Schweiz", SP) and the Swiss green party (Swiss Green Party, German: "Grüne Schweiz", GPS). Switzerland, the SP and the GPS are suited for the following reasons.

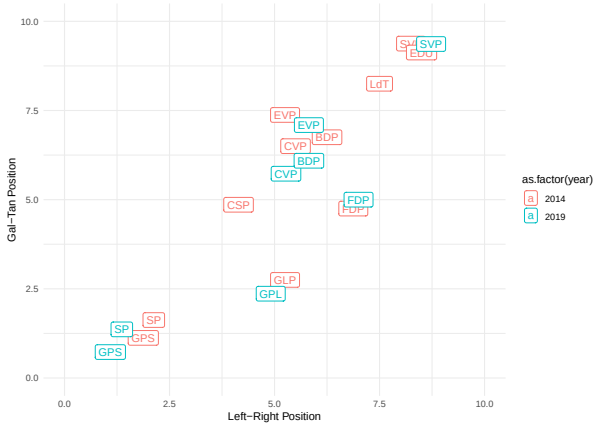
First, environemental issues have become more salient in Switzerland over the past twenty years. Lüth and Schaffer (2022, 171) show that the electoral importance of energy and environmental issues among Swiss voters has increased between 2002 and 2022. This increase in salience is driven by voters (Lüth and Schaffer 2022, 184), thus political parties need to respond to this development and place environemental issues on their agenda.

Second, Switzerland has an electoral system that accommodates smaller parties, as highlighted by Linder and Mueller (2017, 102). The electoral success of small parties such as the GPS (see Figure X) further highlights how the Swiss electoral system accommodates and fosters small parties.



Source: Swiss Federal Statistical Office (https://www.bfs.admin.ch/bfs/en/home/statistics/catalogues-databases.assetdetail.27145667.html, retrieved 9 May 2024)

Third, I argue that the SP perceive the GPS as an electoral threat. The GPS has increased their vote share in the past 20 years, while the SP have lost vote share. Specifically, the GPS has increased its share of votes in the Swiss National Council from 7.43% in 2003 to 13.24% in 2019, while the SP has decreased its share from 23.33% to 16.84% over the same period.



Source: 2014 and 2019 Chapel Hill Expert Surveys (https://www.chesdata.eu/ches-europe, retrieved 9 May 2024)

I consider this electoral success of the GPS to have occurred at the expense of the SP. This is because both parties belong to the same party family and are thus ideologically close. Both parties highlight issues such as social welfare and gender equality and both are pro-union (Linder and Mueller 2017, 132, 136, 137). When examining both parties in a two-dimensional left-right/liberal-authoritarian ideological space, the SP and GPS are their closest neighbors (see Figure X). Following this spatial argument, both parties are interested in canvassing the same group of voters.

In sum, the SP emphasises environmental issues in an effort to win over voters from the GPS, a small party that it perceives to be an electoral threat. The SP does this by proposing parliamentary bills that cover environmental topics that are similar in content to GPS bills.

Data and Methods

Data

Parliamentary Bills My analysis covers 2841 parliamentary bills[1] that include the tag "Environment" (German: "Umwelt").[2] These bills were introduced by the SP and GPS party or by their members of parliament in both chambers of the Swiss parliament, namely the National Council ("Nationalrat") or the Council of States ("Ständerat"). The parliamentary bills are provided by the open data webservices of the Swiss parliament.[3] These webservices are made accessible through the R package "swissparl" (Zumbach and Gföhler 2021).

Due to Switzerland's four official languages, parliamentary items of business can be written either in German, French, Italian or Romansh. The Federal Administration (German: "Bundesverwaltung") translates most items of business in to German, French and Italian. Some are only translated into German and French.[4] In the context of this research, I have chosen to use parliamentary bills in German, as my German is more proficient than my French, simplifying the examination process.

The bills under examination were introduced between March 2004 and December 2023. I choose this time frame because it coincides with the electoral rise of the GPS and also covers a substantial time frame before the increased salience of environmental issues starting in the beginning of the 2010s. This allows for a before-after comparison.

[1] Parliamentary bills include the following nine types of parliamentary proposals that are possible to introduce in the Swiss parliament (translation provided by the Swiss parliament unless stated otherwise): Parliamentary Initiative ("Parlamentarische Initiative"), Question ("Anfrage"), Urgent Question (own translation: "Dringliche Anfrage"), Interpellation ("Interpellation"), Urgent Interpellation (own translation: "Dringliche Interpellation"), Motions ("Motion"), Postulates ("Postulat"), Question Time – Question ("Fragestunde – Frage"), Petitions ("Petition")

[2] Employees of the Parliamentary Services tag bills with one or several of the following terms that were developed by the Parliamentary Library (Source: Personal email communication with the media spokesperson for the Parliamentary Services): National Policy ("Staatspolitik"), General Law ("Recht Allgemein"), International Politics ("Internationale Politik"), Economy ("Wirtschaft"), Parliament ("Parlament"), Finance ("Finanzwesen"), Social Issues ("Soziale Fragen"), Transportation ("Verkehr"), Environment ("Umwelt"), Urban Planning and Housing ("Raumplanung und Wohnungswesen"), Health ("Gesundheit"), Education ("Bildung"), Media and Communication ("Medien und Kommunikation"), Security Policy ("Sicherheitspolitik"), Agriculture ("Landwirtschaft"), Migration ("Migration"), Science and Research ("Wissenschaft und Forschung"), European Policy ("Europapolitik"), Culture ("Kultur"), Energy ("Energie"), Civil Law ("Zivilrecht"), Employment and Labor ("Beschäftigung und Arbeit"), Human Rights ("Menschenrechte"), Criminal Law ("Strafrecht"), International Law ("Internationales Recht"), Taxation ("Steuer"), Social Protection ("Sozialer Schutz"), Judiciary ("Gerichtswesen"). Own translation from German to English.

[3] https://www.parlament.ch/de/%C3%BCber-das-parlament/fakten-und-zahlen/open-data-web-services, retrieved 12 May 2024

[4] https://www.parlament.ch/de/%C3%BCber-das-parlament/parlamentsw%C3%B6rterbuch/parlamentsw%C3%B6rterbuch-detail?WordId=206, retrieved 14 May 2024

I continue with a brief overview of descriptive statistics of the parliamentary bills. […]

Public Salience of Environmental Issues Lüth and Schaffer (2022, 171) use the "Swiss Election Study" (Selects)[5] to measure the salience of environmental issues in the public sphere. In this survey, respondents are asked what their "most important problem" is (Variable "mip1"). I calculate the share of respondents who chose "Environment & Energy" as their most important problem at the time of survey from a list of different issues.[6] This provides a solid measurement of the public salience of environmental issues. However, the Selects survey is only carried out every four years during Swiss parliamentary elections, thus providing only four data points in my time range of examination (2007, 2011, 2015 and 2019). This stands in contrast to the number of sessions in this time period that I will use to group parliamentary bills by (see further below). I thus need a way of measuring public salience of environmental topics on a more frequent basis.

I turn to Google Trends[7] as an alternative way to measure public salience. Google Trends is a tool that enables the evaluation of public interest in specific search terms and topics (Nghiem et al. 2016, 10). Data on Google Trends are available from 2004 onwards. I examine the monthly popularity of the search term "climate change" in Switzerland between January 2004 and May 2024. I pick the search term "climate change" because it is largely congruent with the same issues that the Selects question described above touches upon. It is thus an adequat way of measuring public salience of environemtal topics.

Operationalisation

Dependent Variable: Semantic Similarity using Word Embeddings In order to test the hypothesis, it is necessary to measure the content similarity between parliamentary bills. This leads into the realm of natural language processing, short NLP, and approaches that use text as data (Rodriguez and Spirling 2022). In NLP terms, how can the semantic similarity between documents, in particular parliamentary bills, be calculated (Ali et al. 2018, 907)?

The "Word Mover's Distance" is a method proposed by Wang and Dong (2020, 4) for measuring the semantic distance between documents. This technique applies the concept of text representation in semantic space as a means of measuring similarity. The underlying principle is to represent a text as a point in a multidimensional semantic space (Jurafsky and Martin 2009, 109). In this space, texts that are semantically similar are positioned closer to each other than

[5] https://forscenter.ch/projects/selects/, retrieved 12 May 2024

[6] All issues respondents could pick as their "most important problem": Agriculture, economics, education and youth & culture, environment & energy, European integration, finances & taxes, gender issues & discrimination, immigration & asylum, international relations&conflicts and foreign policy & army, labour market, law & order, political system and parties & politicians, public health, public service & infrastructure, regions & national cohesion, social security, other problems, no problem, don't know / no answer / wildcode.

[7] https://trends.google.com, retrieved 12 May 2024

texts that are dissimilar. Consequently, the distance between two texts in this space can be used to make a statement about their semantic similarity.

In order to place text in this semantic space, the meaning of a text must be converted into embeddings. These embeddings are learned representations of word meanings (Jurafsky and Martin 2009, 97). In short, these representations are computed using the probability of a word appearing near another word in the same text (Jurafsky and Martin 2009, 122). The representations take the form of vectors (Jurafsky and Martin 2009, 109), which are simply a list of numbers (Jurafsky and Martin 2009, 111) that represent the location of a text in semantic space.

Embeddings are good at recognising synonyms, e.g., showing that the words "car" and "automobile" have a high semantic similarity (Jurafsky and Martin 2009, 121). This principle of embedding single words can be extended to whole documents, where a document represents a point in the semantic space instead of a single word (Le and Mikolov 2014). Thus embeddings can be used to measure the similarity between documents, in this case parliamentary bills. In political science, embeddings have also been used to measure the positions of candidates (Case 2023, 11) and party ideology (Rheault and Cochrane 2020, 29). They are thus a tried and tested technique for analysing political texts.

Parties introduce different numbers of bills in each parliamentary session.[8] For this reason, and also because it does not make sense to compare single parliamentary bills with each other, I group all bills put forward by a party in a session and calculate the "middle point" of these bills in the semantic space. This middle point can be found by calculating the average position of all documents in a group.

This centroid represents the overall semantic content of all bills in a group. In other words, the "middle point" reflects the overall semantic content of a party in a session. It effectively summarizes the collective characteristics or the "average" bill within a group, thus identifying the group's central tendencies and general direction of content. The distance between two groups in semantic space, i.e., two middle points, can be calculated using the Euclidean distance measure. This measure requires the coordinates of two points in order to calculate the distance between these points. The coordinates of the middle points are given, thus calculating the distance can be performed with the function X in the programming language R.

To sum up, in order to measure the semantic similarity between the parliamentary bills introduced by the SP and GPS, I place these bills in semantic space. I then group the bills by party and session and then calculate the middle point of each group. Using the Euclidean distance measure, I calculate the distance between the middle points of groups in semantic space. The

[8] The Swiss parliament meets in four ordinary three-week sessions per year. Additionally, the parliament assembles for further sessions, named "special" or "extraordinary" sessions that deal with issues that were not dealt with in the ordinary sessions (https://www.parlament.ch/en/%C3%BCber-das-parlament/parlamentsw%C3%B6rterbuch/parlamentsw%C3%B6rterbuch-detail?WordId=197, retrieved 10 May 2024).

more semantically similar two groups of bills are, the smaller the distance between them in semantic space.

I continue with an overview of descriptive statistics of the semantic similarity between bills introduced by the two parties. […]

Independent Variable: Salience of Environmental Issues with Google Trends Google Trends provides a positive integer value to measure the "search interest" of a term within a specific time frame and geographic region.[9] These values are scaled between 0 and 100, reflecting a topic's proportion relative to all searches across all topics.[10] When examining the search term "climate change" in Switzerland between January 2004 and May 2024, there is an outlier in April 2022. This is likely due to the United Nation's Intergovernmental Panel on Climate Change (IPCC) report published in April 2022,[11] which was widely discussed in the media.

This outlier, with a value of 100, causes the rest of the data series to display relatively low variation due to the way Google Trends scales values (see line A in Figure X *(add figure)*). This low variation becomes more apparent when comparing the Google Trends data up until March 2022 (see line B in Figure X *(add figure)*). Low variation is problematic for modeling the data later on, as it makes effects less pronounced. To restore the variation lost in the time series that includes April 2022, I recalculated each value by following these steps: First, I calculate the relative change of each value in the shorter series with respect to the first value, obtaining the "multiplier." Second, I align the starting points of both series by adding a value of X to the longer series. Third, I multiply each value in the longer series by the "multiplier" from the first step. This results in a more pronounced variation in the longer series that mirrors the shorter series (see line C in Figure X *(add figure)*).

Methods

Differencing and Time Lag Due to the limited scope of this seminar paper, I keep the analysis simple by examining the variable change between observations instead of creating a time series model. The purpose of using the change between observations is to explore a potential relationship between the variables without considering the factor of time. To retrieve the difference, I calculate the change in both the independent and dependent variables from one parliamentary session to the next and use these as my new independent and dependent variables. In the next step, I lag the dependent variable by one unit, i.e., by one session. This approach aims to model the delayed effect of environmental topics in the public sphere on parties and the parliamentary

[9] https://trends.google.com, retrieved 13 May 2024

[10] https://support.google.com/trends/answer/4365533?hl=en&ref_topic=6248052&sjid=14532437735057784414-EU, retrieved 13 May 2024

[11] https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/

bills they introduce as a reaction. In other words, I assume a delay in parties reacting to an increase in public salience.

Correlation

In a first step, I calculate the correlation between the dependent and independent variables using the Pearson Correlation. This method is appropriate as an initial, simple examination to see if there is a correlation between the two variables. Since both variables need to be normally distributed for the correlation to hold, I log-transform the dependent variable.

Linear Regression

In a second step, I model the relationship of the differences using linear regression to determine if there is a linear relationship between the two variables. Given the data, this is the best-suited method because it allows me to test the relationship between two continuous variables.

Model Specifications

Change in semantic distance between SP and Greens = β + change in Google Trends Topic Salience + error

Lagged change in semantic distance between SP and Greens = β + change in Google Trends Topic Salience + error

Results

[…]

Conclusion

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Appendix

Code and soures to data are available at https://github.com/fabianaiolfi/ […]