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The Effect of Beliefs on Policy Instrument Preferences: The Case of Swiss Renewable Energy Policy

Lorenz Kammermann and Mario Angst

This article explores how beliefs affect preferences leading to policy instrument choices of elite actors. Beliefs are general attitudes regarding a given policy field, for example toward the role of the state or the urgency of a problem. Both beliefs and preferences are central for applications of Sabatier's Advocacy Coalition Framework, but their interrelationship has remained undertheorized. Understanding how beliefs and preferences are linked can provide important insights into policy instrument choice, while improving the comparability of studies across policy subsystems. The article compares the relative contribution of beliefs to shaping instrument choices of elite actors in the domain of Swiss renewable energy policy. Results suggest that beliefs are likely to play a prominent role in shaping instrument choice. We find that policy core beliefs translate into preferences through a process involving two main pathways. First, some policy beliefs primarily influence the preferred characteristics of the overall instrument mix. Second, some policy beliefs are primarily associated with preferences for specific instruments. Some policy beliefs are influential via both pathways. These, therefore, emerge as especially important factors shaping the policy process. Our results offer insights for policymakers into how potential future conflicts in negotiations can be attenuated.

KEY WORDS: beliefs, preferences, Advocacy Coalition Framework, renewable energy, Bayesian data analysis

本文探究了政策信仰如何能影响政治偏好，后者导致形成精英行动者的政策工具选择。信仰是关于一个既定政策领域的一般态度，例如对国家产生的作用或对一个问题的紧迫性所持的态度。信仰和偏好在萨巴蒂尔（*Sabatier*）提出的倡导联盟框架应用中发挥了关键作用，但信仰和偏好之间的相互关系还没有足够的理论研究。理解信仰和偏好之间的联系能提供有关政策工具选择的重要见解，同时提高不同政策子系统研究的可比较性。本文比较了信仰对"影响瑞士可再生能源政策领域的精英行动者的工具选择"作出的相对贡献。研究结果暗示，信仰很有可能在影响工具选择时发挥主要作用。我们发现，政策核心信仰通过一个包含两种主要路径的过程，进而转化为不同偏好。第一，一些政策信仰主要影响全部工具组合的偏好特征。第二，一些政策信仰主要与特定工具偏好相联系。一些政策信仰在这两种路径中都具有影响力。这些信仰因此作为影响政策过程的特别重要因素而出现。我们的研究结果为决策者就如何减少政策磋商中潜在的未来冲突提供了相关见解。

关键词: 贝叶斯数据分析, 政策信仰, 倡导联盟框架

Este artículo explora cómo las creencias afectan las preferencias que conducen a la elección de instrumentos políticos de los actores de élite. Las creencias son actitudes generales con

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respecto a un campo de política dado, por ejemplo, hacia el papel del estado o la urgencia de un problema. Tanto las creencias como las preferencias son fundamentales para las aplicaciones del Marco de coalición de defensa de Sabatier, pero su interrelación ha permanecido sin teorizar. Comprender cómo se vinculan las creencias y las preferencias puede proporcionar información importante sobre la elección de instrumentos de políticas al tiempo que mejora la comparabilidad de los estudios entre los subsistemas de políticas. El documento compara la contribución relativa de las creencias a la configuración de las opciones de instrumentos de los actores de élite en el dominio de la política suiza de energía renovable. Los resultados sugieren que es probable que las creencias desempeñen un papel destacado en la elección del instrumento de conformación. Encontramos que las creencias centrales de las políticas se traducen en preferencias a través de un proceso que involucra dos vías principales. Primero, algunas creencias políticas influyen principalmente en las características preferidas de la combinación general de instrumentos. En segundo lugar, algunas creencias políticas se asocian principalmente con preferencias por instrumentos específicos. Algunas creencias políticas influyen en ambas vías. Estos, por lo tanto, emergen como factores especialmente importantes que dan forma al proceso de políticas. Nuestros resultados ofrecen información para los responsables políticos sobre cómo se pueden atenuar los posibles conflictos futuros en las negociaciones.

PALABRAS CLAVE: análisis de datos bayesianos, creencias políticas, marco de coalición de defensa

1. Introduction

During policy formulation, elite actors such as administrative entities, political parties, interest groups, but also environmental non-governmental organizations (E-NGOs), choose from a multitude of single policy instruments and combinations of multiple instruments (i.e., instrument mixes) to solve problems that arise on the political agenda (Bressers & O'Toole, 1998; Howlett, 2011). One crucial factor that shapes elite actors' preferences for policy instruments and thus eventually instrument choice are elite actors' beliefs. Previous studies generally agree that such beliefs affect preference formation and what instruments elite actors select, which in turn shapes how a sector is regulated (Bidwell, 2013; Converse, 1964; Hall, 1993; Jacobs, 2008; Moyson, 2017; Peffley & Hurwitz, 1985; Pierce & Steel, 2017; Tetlock, 1986). For example, in the energy sector, Martinez-Gallardo and Murillo (2011) show in their study about electricity privatization in Latin America that beliefs of governments (e.g., free market or anti-communist beliefs) were central for eliminating barriers of entry for new investors and thus shaped specific instrument choice. However, elite actors often have multiple conflicting beliefs and may have to prioritize among them (Knox-Hayes, 2012; Nohrstedt, 2010). Consequently, it is often difficult to predict how elite actors will solve a problem and what instruments they will choose in order to do so. In other words, our understanding of the relationship between beliefs and policy is still limited. For a better comprehension of current and future policy instrument choices, this article builds on previous studies and focuses in detail on how beliefs shape preferences and thus instrument choice.

On a theoretical level, the transformation of general beliefs into more detailed preferences toward tangible instruments has remained somewhat of a black box.

The literature describes the relationship between beliefs and secondary aspects as hierarchical (Converse, 1964; Sabatier, 1988; Schwartz, 1994). More precisely, beliefs are presumed to determine elite actors' preferences regarding a specific problem. Sabatier's (1988) Advocacy Coalition Framework (ACF) makes extensive use of this conceptualization (Pierce, Peterson, Jones, Garrard, & Vu, 2017): Policy core beliefs (i.e., issue-specific values) mainly determine secondary aspects (i.e., preferences). In applications of the ACF, policy core beliefs are mostly used for the identification of issue-specific coalitions (Jenkins-Smith, Nohrstedt, Weible, & Sabatier, 2014; Schlager, 1995), aggregated at the coalition level for the assessment of policy outputs after a political process (Pierce, Peterson, & Hicks, 2017), and for the determination of policy-oriented learning within coalitions (Weible & Jenkins-Smith, 2016). The link between policy core beliefs and secondary aspects is central for all three theories included in the ACF (coalition building, learning, and policy change). Still, empirical studies focusing specifically on their linkage are scarce (Jacobs, 2008; Weible, 2006; Weible, Heikkila, & Pierce, 2015), which has led to calls for "a consistent logic for connection of the deep core to the policy core and secondary beliefs" (Jenkins-Smith, Silva, Gupta, & Ripberger, 2014, p. 488). The article thus asks *what is the relative contribution of policy core beliefs to shaping secondary aspects and thus instrument choice?*

A clarification of the interrelationship between beliefs and preferences is essential for further theory development (Ingold, Stadelmann-Steffen, & Kammermann, 2018; Kukkonen, Ylä-Anttila, & Broadbent, 2017). Beyond theory, this clarification is further relevant for policymakers as well as administrative entities and other elite actors, because knowledge about how beliefs or ideology converts into preferences allows them to anticipate potential conflicts. The article takes up and extends recent debates about how different factors affect preference formation. Song, Kwon, Cha, and Min (2016) for example elaborate on how individual motivations change preferences for specific instruments. Tatham and Bauer (2016) systematize different approaches for preference formation in crisis situations. By adding a belief perspective to the current literature, we illuminate the role of another important factor leading to distinct preferences. If beliefs truly have the decisive effect on preferences for policy solutions that the ACF suggests they do, then potential conflicts not only in the domain of renewable energy policy, but in any policy field can be better anticipated and maybe even resolved (Henry & Dietz, 2012; Knox-Hayes, 2012; Nohrstedt, 2010; Schulz, Martin-Ortega, & Glenk, 2018).

We conceptually outline how policy core beliefs affect the formation of policy instrument preferences and thus later instrument choice. We start from the central assumption that in advanced democracies so-called elite actors are crucial for the determination of current and future instruments. For this reason, we focus on elite actors in five Swiss cantons (constituent states) in the domain of their respective canton's renewable energy policy in our empirical analysis. In our case, these actors include administrative entities, parties, interest groups, and E-NGOs. As such, elite actors are collective entities that are actively involved in cantonal RE policymaking (Laumann & Knoke, 1987).

Our focus on RE policy in Switzerland is motivated by the fact that Switzerland decided to phase out nuclear power and transform its electricity system in a popular referendum in 2017. Switzerland thus constitutes an interesting case for other countries that have not yet made such a decision. We investigate the domain of renewable energy policy, as it has been the subject of a lively debate in Switzerland, making it an auspicious domain for capturing recent active beliefs. Methodologically, the article uses generalized linear regression modeling within a Bayesian framework (Gill & Witko, 2013; Ord, 1975) to assess the contribution of different factors influencing elite actors' preferences regarding the promotion of RE.

2. Theory

2.1. Hierarchical Beliefs Systems and the ACF

Beliefs and values have long been recognized to be relevant for the formation of secondary aspects. Authors such as Tetlock (1986), Hurwitz and Peffley (1987), Hall (1993), or more recently Hedlund-de Witt, Boer, and Boersema (2014) or Weible et al. (2015) find evidence for a hierarchical beliefs structure, and more precisely for the influence of basic value perceptions on specific decisions.

The combination of different levels of values as belief systems can be more specifically defined "as a configuration of ideas and attitudes in which the elements are bound together by some form of constraint or functional interdependence" (Converse, 2006, p. 3). This conceptualization of beliefs has found considerable attention in policy process theories in general and especially in Sabatier's (1988) ACF. Sabatier uses the term of deep core beliefs for the fundamental, highest-level values individuals as well as also collective actors employ for decision making (e.g., a "liberal" worldview). For the definition of deep core beliefs, it is important that they are generally unrelated to any policy field and too diffuse to lead to specific policies. Policy core beliefs, on a lower level, are the translation of the deep core into a specific policy subsystem (i.e., a topical area with a geographic territory and specific elite actors involved) and what basic long-term goals should be pursued therein (e.g., increasing the share of renewables in the electricity mix). Secondary aspects, on the lowest level, are the most detailed and most susceptible to change. They primarily contain specific opinions about how and with what means the goals determined by the policy core beliefs should be achieved (e.g., preferences for policy instruments that target a specific aspect of the issue; Jenkins-Smith, Nohrstedt, Weible, & Ingold, 2017; Sabatier & Jenkins-Smith, 1993). The main difference between policy core beliefs and secondary aspects is that the latter relate to the implementation of policy whereas the prior are about goals that should be achieved in a specific domain (Jenkins-Smith et al., 2017). Figure 1 presents the relation between the three levels of beliefs as utilized in the ACF.

The connection between policy core beliefs and what specific secondary aspects they trigger is described by Sabatier and Jenkins-Smith (1993) as an assessment of costs and benefits. Elite actors may perceive one policy instrument to be preferable to the other because they consider a given cost-benefit ratio as better for themselves

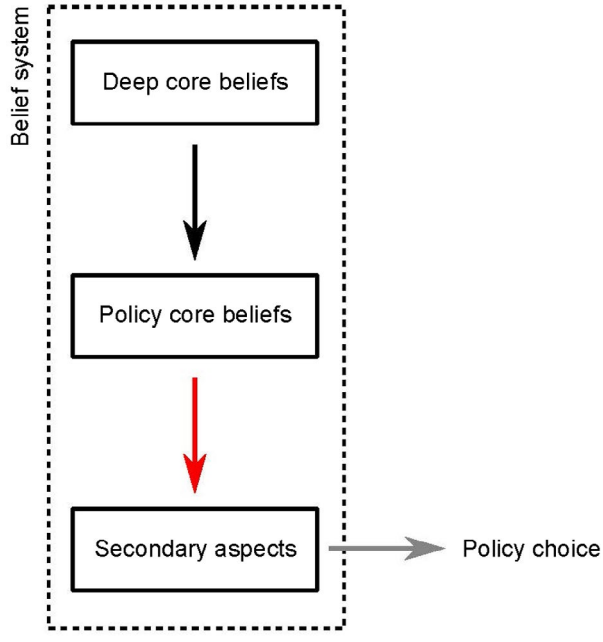

Figure 1. The Structure of Hierarchical Belief Systems in the Advocacy Coalition Framework (Sabatier, 1988).
Note: Red arrow indicates relation under investigation in this article. [Colour figure can be viewed at wileyonlinelibrary.com]

and the individuals they represent. Different beliefs about the ideal state of a policy subsystem may, therefore, trigger various instrument preferences (i.e., secondary aspects). In other words, higher-level beliefs define the parameters of which solutions to a problem are generally considered, and which one (from this pre-selection) is then implemented (Sabatier & Mazmanian, 1980). Sabatier's (1988) conceptualization of decision making follows a bounded rationalistic approach to instrument choice in line with other authors such as Hall (1993). We acknowledge that there are other ways to conceptualize instrument choice such as "settings" dominant or "chaos" dominant approaches that are, however, not the focus of this paper (see, e.g., Jordan, Wurzel, Zito, & Bruckner, 2003).

A cost-benefit consideration is further complicated by the fact that elite actors do not have beliefs that are fully consistent. For example, in the domain of RE policy, elite actors might hold the beliefs that RE should be pushed strongly in order to mitigate climate change. At the same time, they might be reluctant to liberalize the construction of new RE power plants because they also consider water and landscape quality to be of high relevance (e.g., in the case of hydroelectricity; see, e.g., Costa-Campi, del Rio, & Trujillo-Baute, 2017). Which belief is considered to be more relevant can, according to Schwartz (1994) and others, be determined by their level in the belief hierarchy. Which specific policy core beliefs prevail in the formation of secondary aspects in such conflictive situations has remained largely unclear. Weible (2006) and Weible et al. (2015) stress in their studies that higher level deep core beliefs do not significantly affect specific secondary aspects, whereas

mid-level policy core beliefs do. The authors' interpretation of their results suggests that elite actors use their deep core beliefs for the evaluation of long-term targets but not for more precise and short-term measures. Some studies also specifically consider the effect of beliefs on instrument preferences in the domain of renewable energy: Demski, Butler, Parkhill, Spence, and Pidgeon (2015), for example, find that the belief in energy system change is especially relevant for the formation of specific preferences. Kammermann and Dermont (2018), moreover, find that the citizens who believe that climate change is human-induced show higher support for policies for a nuclear phase-out than citizens who do not share this belief. Our article, therefore, continues their work and explores what policy core beliefs trigger specific secondary aspects, shedding light on the link between the two.

RE policy has multiple belief dimensions relevant for instrument choice that have been been theoretically articulated. Generally, there are three belief dimensions that are commonly considered when analyzing the selection and implementation of policy instruments in the sector or the formation of coalitions: the conflict between economic and environmental issues common to all infrastructure sectors; the discussion of who should intervene in the subsystem; and trade-offs among approaches to energy policy (energy production vs. energy efficiency). These theoretical dimensions have also been documented empirically: Kriesi and Jegen (2000) find that especially the trade-off between economic development and growth, and environmental protection plays a central role for instrument choice in Swiss energy policy. Markard, Suter, and Ingold (2016) elaborate that with the new energy strategy, elite actors' beliefs have become more diverse, and, therefore, instrument choice has become more challenging. Pierce and Steel (2017) find that it matters to elite actors which state level (i.e., national, state, or regional authorities) intervenes in the subsystem and sets new regulation for the deployment of RE. Furthermore, the conflict between energy efficiency and energy production has been addressed by Rosenow, Kern, and Rogge (2017). In this article, we elaborate on these three dimensions, and will further expand the aforementioned scholarly work.

2.2. Selecting Policy Instruments

We primarily focus on actors' specific instrument preferences regarding the promotion of renewable energy in Switzerland. Switzerland, as well as other nation states, has a plethora of policy instruments available to solve issues that arise on the political agenda (Kammermann, 2018). Policy instruments are defined as measures employed by the state to achieve at least somewhat specific goals set in a policy domain.

Contemporary literature stresses the significance of instrument mixes (as opposed to a single instrument or modular tool-box approaches) for policy design (Flanagan, Uyarra, & Laranja, 2011). New instruments depend on measures that are currently in place or are implemented simultaneously. This factor is of great importance because combinations of instruments develop interdependencies and effects that may have substantial impacts on target groups (Kammermann & Dermont, 2018; Rosenow et al., 2017).

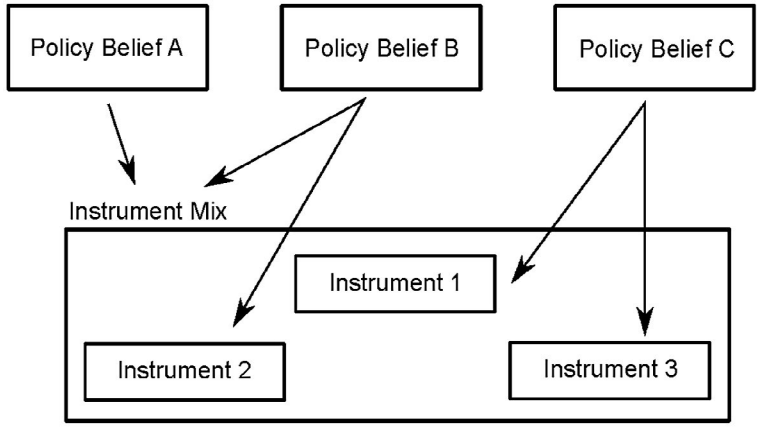

Figure 2. Schematic Drawing Representing Two Types of Influence Pathways for Policy Beliefs on Instrument Preferences. Policy Beliefs Can Influence the Overall Composition of the Instrument Mix, Specific Instrument Preferences, or Both.

In order for us to understand what shapes current and future instrument mixes, it is, therefore, essential to understand how beliefs impact instrument preferences. We suggest that beliefs can affect preferences in two main ways (see Figure 2): First, beliefs can directly influence the preferences for single, specific instruments. Second, beliefs may also influence preferences regarding the general instrument mix and not for specific single instruments. In this article, we cover both these aspects. Generally, we argue that policy core beliefs shape specific instrument preferences and general preferences for multiple instruments in the mix of instruments in predictable ways. We expect that policy beliefs influence preferences for specific instruments, but that this influence varies heavily across beliefs. This varying influence may show itself in three ways: The policy core belief in the "free market" may lower the preference for single instruments that distort a free market, such as providing subsidies (effect on the single instrument). The policy core belief in strong "state intervention" may affect the preference for the more general policy mix (effect on policy mix characteristics). Finally, a policy core belief may affect both the single instrument choice and the preferences for the broader policy mix characteristics such as the possible belief that climate change is an urgent issue. Such a policy core belief may affect the choice of strong single instruments such as minimal standards. It will, however, additionally likely lead to increased preferences for a comprehensive policy mix, independently from the specific measures the mix contains. The key question then concerns which policy core beliefs affect which secondary aspects.

3. Research Design

3.1. Case and Data

In a 2017 popular referendum, the Swiss people accepted a new strategy that initiates the reform of the current energy system. One of the main elements of the

Swiss transition will be a nuclear phase-out, to be gradually enforced until 2050. With all nuclear reactors off the grid, Switzerland will need to replace about 40 percent (26.4 TWh in 2015) of its electricity production. In order to achieve this target, the Swiss people also agreed to an increase in a tax on electricity consumption. This tax is mainly used as a fund for a feed-in tariff on RE. However, even with this increased effort, Switzerland will miss its newly set targets at its current pace. For that reason, the subnational level (i.e., the cantons) will also have to take action, due to the principle of subsidiarity (Sager, 2014). Switzerland is a highly federalist country that delegates all competences that are not explicitly regulated on the national level to the next lower subnational level (subsidiarity; Vatter, 2016). Cantons are currently adapting their goals and instruments to the new national energy act (Kammermann & Ingold, 2018). This creates a set of policy subsystems (Weible et al., 2011) revolving around RE policy, delineated by a territorial boundary (cantonal borders), within which different elite actors try to influence the eventual make-up of regulation in their canton. These subsystems can be considered nascent subsystems. Nascent subsystems are newly formed subsystems, which are likely to follow different dynamics than established, mature subsystems, especially because elite actors are not yet aligned in a stable fashion, and are susceptible to new influences and changing circumstances (Ingold, Fischer, & Cairney, 2017). Besides the geographic (cantonal borders) and topical (renewable energy policy) boundaries, elite actors are the third element of a subsystem. The elite actors involved in renewable energy policy on the cantonal level are similar to the national level and consist of administrative entities, business groups, E-NGOs, political parties, utilities, and a limited number of scientific actors. Figure 3 visualizes the actor network existing within each cantonal subsystem.

The range of policy instruments debated on the cantonal level is broad; all instrument types are generally deliberated. One exception is the cantonal introduction of another feed-in tariff that is not considered to be feasible because of high financial costs and potential legal disputes with the national level. Other instruments, such as information campaign, subsidies, minimal standards, or stronger regulative measures, are up for debate. The list of instruments that could potentially be introduced at the cantonal level was validated and assessed for its feasibility by expert interviews.

Data were collected through a standardized survey among elite actors in five cantons (Bern, Lucerne, Valais, Uri, and Thurgau) that accurately represent the geographic, social, and political landscape of Switzerland. Geographically, the cantons are situated in different regions of the country (Uri and Valais represent the mountainous parts of the country, Lucerne and Bern both cover the central plateau, and Thurgau is situated at Lake Konstanz). Due to their topographical differences, the cantons have varying potentials with regard to RE sources (water, wind, and solar). Furthermore, the case selection accurately reflects the political (more conservative and more liberal states) and cultural (e.g., language) characteristics of Swiss regions. Switzerland has three main language regions (Swiss-German, French, and Italian). We chose to focus on the two predominant ones (French and German), which together are spoken by more than 85 percent of the population. Of the cantons covered in our

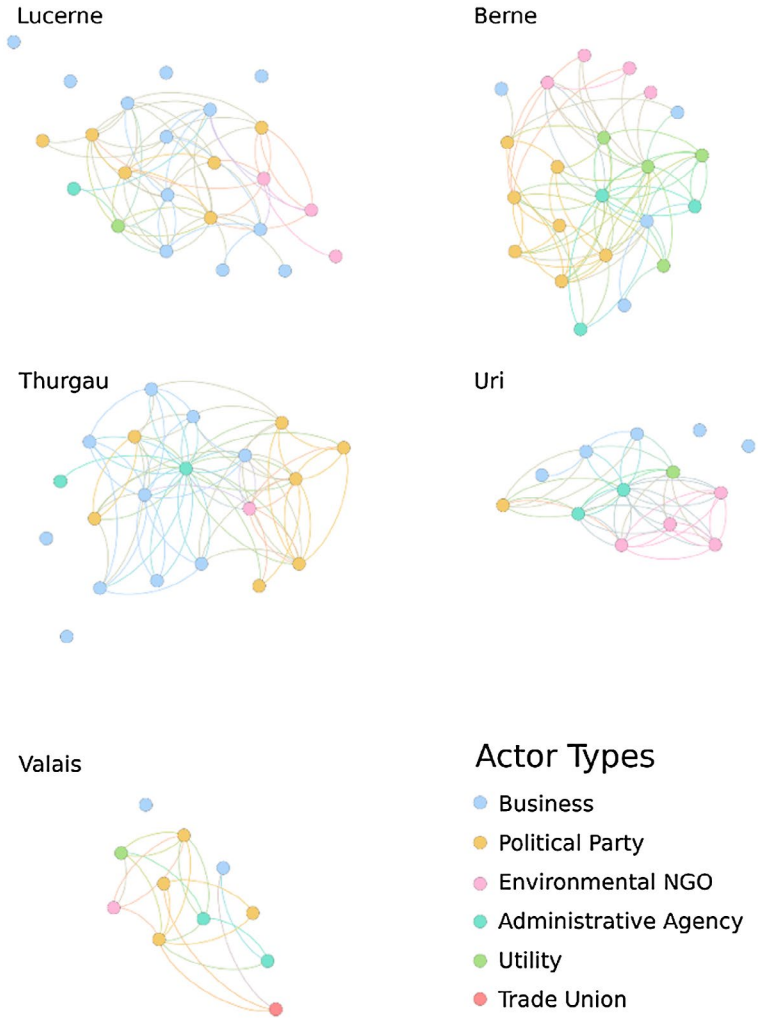

Figure 3. Renewable Energy Policy Subsystems in Five Swiss Cantons Visualized as Five Networks Between Organizations Active in the Domain on the Cantonal Level.
Note: Circles indicate organizations, such as administrative agencies or E-NGOs. Lines between circles indicate that the organizations collaborated during the elaboration major revisions of the cantonal energy acts. [Colour figure can be viewed at wileyonlinelibrary.com]

analysis, the canton of Valais is mainly French speaking, Bern is bilingual, and the other three are German speaking. Furthermore, Bern has a large left-leaning urban center; Valais and Uri are conservative, mountainous cantons; and Lucerne and Thurgau represent more economically liberal, center-right regions.

The survey was distributed in 2016 by postal mail, and later as an online pdf form among a selected group of elite actors that are involved in current cantonal RE policy. Elite actors were selected according to a combination of the positional, decisional, and reputational approaches outlined in Pappi and Henning (1998). This process selects elite actors that have one or both of the following characteristics: they

are able to influence the content of a policy proposal, or they have formal voting powers on it. Within the survey, actors had the option to assess the importance of their peers and indicate whether they considered the other elite actors relevant to the policy-making process. Respondents could also add missing elite actors that were considered important to the survey list.

Response rates per canton ranged from 62 to 83 percent. All responses were aggregated in a single data set with a total of 89 elite actors. The data set includes questions about elite actors' policy core beliefs as well as about their secondary aspects regarding cantonal and national instrument mixes. Furthermore, relational data about coordination between elite actors within each cantonal subsystem was also gathered. By a survey design for the assessment of instrument preferences and beliefs, we follow other authors in the field such as Kriesi and Jegen (2000) or Ingold (2011).

3.2. Measurement

This section first introduces how the dependent variables were measured. The dependent variables were on the one hand elite actors' policy preferences/secondary aspects regarding the 14 individual cantonal instruments and on the other hand their preferences regarding the overall instrument mix for the promotion of RE. We then present the measurement of beliefs, our main independent variables of interest. The measurement of all variables is further summarized in Table A1 in the Appendix.

Elite actors were asked to indicate their preferred instrument mix in their respective canton based on an extensive list of 14 instruments. They could select whether they considered an instrument of primary or secondary importance for the canton or whether the canton should not employ this instrument. By this approach, elite actors were free to choose any combination of instruments that are currently implemented in their cantons and new instruments. This way, elite actors could express their preferences more freely than in a setting where we would have explicitly highlighted instruments that were already active. Because elite actors are actively involved in policymaking, we can assume that they are aware that instruments are rarely introduced in a vacuum, and are usually restricted by the current instrument mix.

The specific instrument mix of each respondent gave us the chance to measure preferences for each instrument separately. We chose to focus on the likelihood of each individual instrument to be chosen at all. In doing so, we disregarded the information about whether the respondent considered the instrument of primary or secondary importance, as it was not relevant for this particular question. This created a set of 14 binary variables (respondent chose/did not choose the instrument). However, to do so, we needed to ensure that instruments under the study could actually be considered sufficiently different to merit individual consideration. We assessed pairwise similarity between responses for each pair of instruments. If some instruments had been chosen disproportionately often together by respondents, this

would have been a strong indicator that they were considered basically equal in practice, and we would have treated them as such in the analysis. However, this turned out not to be the case. The highest pairwise Jaccard similarity between instruments was 0.5, but most scores were much lower (see Appendix Figure A1).

To assess the preference of each actor regarding how encompassing the instrument mix should be, we computed a simple additive index based on all the instruments chosen by an actor. Primary measures chosen by an actor received a value of 2, secondary measures received a value of 1, and measures that the actor indicated should not be used received the value of 0. The resulting sum can be seen as an additive index of the preference for an encompassing instrument mix for RE promotion for each actor. We are aware that a simple additive index does not take into account the fact that instruments might not contribute equally to an actor's preference for an encompassing instrument mix strength of RE promotion. The choice of some instruments, such as persuasive instruments, might be seen as an indicator of a desire for a generally weak policy mix. However, we believe the combined sum of all choices to be a likely first approximation of an actor's preference for an encompassing policy mix.

The different beliefs that form the paper's main independent variables of interest were collected by asking elite actors to express their agreement or disagreement with specific statements regarding the promotion of RE. Elite actors were able to indicate whether they fully or mostly agreed/disagreed with a statement. The specific statements used in the survey are included in Table A1 in the Appendix. Figure A2 in the Appendix summarizes the distribution of actor beliefs per canton.

3.3. Methods

To assess the strength of the relationship between beliefs and instrument preferences, we fit generalized linear regression models to the data within a Bayesian data analysis framework. In our case, we deemed the use of Bayesian statistics especially appropriate due to the small sample size of elite actors we study. We standardized all variables as suggested in Gelman (2008) by subtracting the mean and dividing by two standard deviations for non-binary variables and subtracting the mean from binary variables. This makes estimate sizes directly comparable as variables are all on the same scale.

We fit two types of models within the R package rstan (Stan Development Team, 2019), related to the two types of associations between beliefs and policy preferences. Both types were fit using a Markov chain Monte Carlo approach. To assess the influence of elite actors' policy beliefs on their overall preference regarding how encompassing the instrument mix for RE promotion should be, we estimated a linear regression model, using the additive index measuring the number of instruments supported in each actor's instrument mix as the dependent variable. We used a weakly informative prior distribution, as prior data of sufficient quality for setting an informative prior was not available. For the intercept and all non-auxiliary parameters, we specified a prior based on a Gaussian distribution with the

location of zero, while using the automatic adjustment based on the range of the data implemented in rstan to set the standard deviation (SD). This led to priors that covered quite a large distribution of potential values (SD = 52 for the intercept and SD = 26 for all non-auxiliary parameters). The range for the standard deviation of the intercept based on this automatic approach almost amounts to a flat prior in our case, including a range of impossible values. However, we deemed it still appropriate given our limited explicit prior knowledge we could incorporate and, crucially, also because posterior distributions were not sensitive to changes in this aspect of the prior.

In order to assess the influence of elite actors' policy beliefs on their preferences regarding the 14 specific instruments for RE promotion, we estimated 14 binomial logistic regression models assessing the likelihood of choosing each given individual policy instrument as the dependent variable. All models contained the same set of independent variables. For the binomial logistic models, we again used weakly informative priors. We used prior distributions based on a Student's t distribution with seven degrees of freedom and location of zero, while again making use of the autoscaling of the distribution's scale implemented in rstan. This was driven by the consideration that such a setup will emphasize coefficients that are probably close to zero (as is likely in a logistic regression and in our case), but can on occasion be large.

Factors other than beliefs may affect the formation of secondary aspects regarding the promotion of RE. To control for such factors, we considered relations between elite actors, the role elite actors take during instrument selection and implementation, and the contextual setting. First, the ACF is often conceptualized as a social network connecting elite actors during a policy process (see e.g., Ingold, 2011). In these networks, information and other resources are exchanged among connected elite actors and especially within coalitions. We assessed the collaboration networks between elite actors by directly asking the relevant elite actors whether they "strongly collaborated" with others during a recent revision of the respective energy acts. Strong collaboration entails discussing new evidence, jointly formulating new policy options, exchanging and coordinating positions, and evaluating policy options. Elite actors received a list of all potentially involved elite actors and could check whether they had strongly collaborated or not. We control for the influence of an actor's network position by including a term measuring the direct influence of an actor's collaboration partners. The term is higher a given elite actor collaborates with many elite actors with preferences for either an encompassing instrument mix (for the linear model) or a given individual instrument of interest (for the logistic models). A positive parameter value for the term would suggest that the presence of elite actors with preferences for an encompassing instrument mix among an actor's immediate collaboration partners is associated with a similarly higher preference for an encompassing instrument mix by the actor itself. The input values for the term were computed using the social network autocorrelation package tnam (Leifeld & Cranmer, 2017) considering the influence of all immediate collaboration partners of an actor (Ingold & Leifeld, 2014; Weible, 2005).

A second aspect that the models consider is the role different types of elite actors take during the policy process. Administrative actors tend to have more moderate

beliefs due to their coordinating function, whereas political parties and interest groups need to present their beliefs more pointedly (Jenkins-Smith et al., 2017). The influence of actor type on preference formation is, therefore, controlled for by including a dummy-coded categorical variable indicating the actor type. Elite actors could be either business, administrative agency, utility, E-NGO, or political party, which (together with the single involved trade union) served as the reference category. In the context of ACF applications, coalition building and learning are two other important components. In this article, we essentially forego these two factors because they are not necessary for answering the research questions and because our results need to hold up independently from the coalition structures in the subsystems. We do, however, present a brief description of elite actors' networks and actor types in Figure 3. The illustration of policy networks shows that in the field of energy elite actors closely collaborate in all five cantons.

A third aspect the models consider is the contextual setting by including a dummy-coded categorical variable, indicating the canton where an actor is located. The canton of Lucerne (the canton with most respondents) serves as the reference group.

4. Analysis and Discussion

This section reports the results of the regression models and discusses them with regard to our research question that asks in how policy core beliefs affect the formation of policy preferences. Where applicable, we corroborated our results with experts from the renewable energy sector. We conducted interviews with three heads of the cantonal energy departments and one representative each from the Swiss Federal Office of Energy SFOE, an E-NGO, and a utility.

We start by analyzing the effects of policy beliefs on preferences for the 14 specific single instruments. Then we proceed by looking at the effects of different policy core beliefs on the preference for an encompassing instrument mix in general. Generally, the model runs converge well. Both for the linear regression and the logistic models, values for the R-hat convergence diagnostic as implemented in rstan are consistently 1, indicating good mixing between chains. Effective sample sizes as computed by rstan are also in most cases above 3000 and always above 2000. We also carried out posterior predictive checks for all models, comparing distributions of the data as observed to a number of distributions generated based on draws from the posterior of the model parameters, all of which are satisfying. These checks can easily be replicated based on the code we provide in the open repository associated with this article, and we thus refrain from including them in this article.

4.1. Preferences for Specific Instruments

The analysis of preferences for single instruments illustrates how the impact of policy core beliefs varies in its importance to the formation of policy preferences depending on the instrument in question. Figure 4 gives an overview of the 14 binomial logistic regression models that were estimated, one for each instrument.

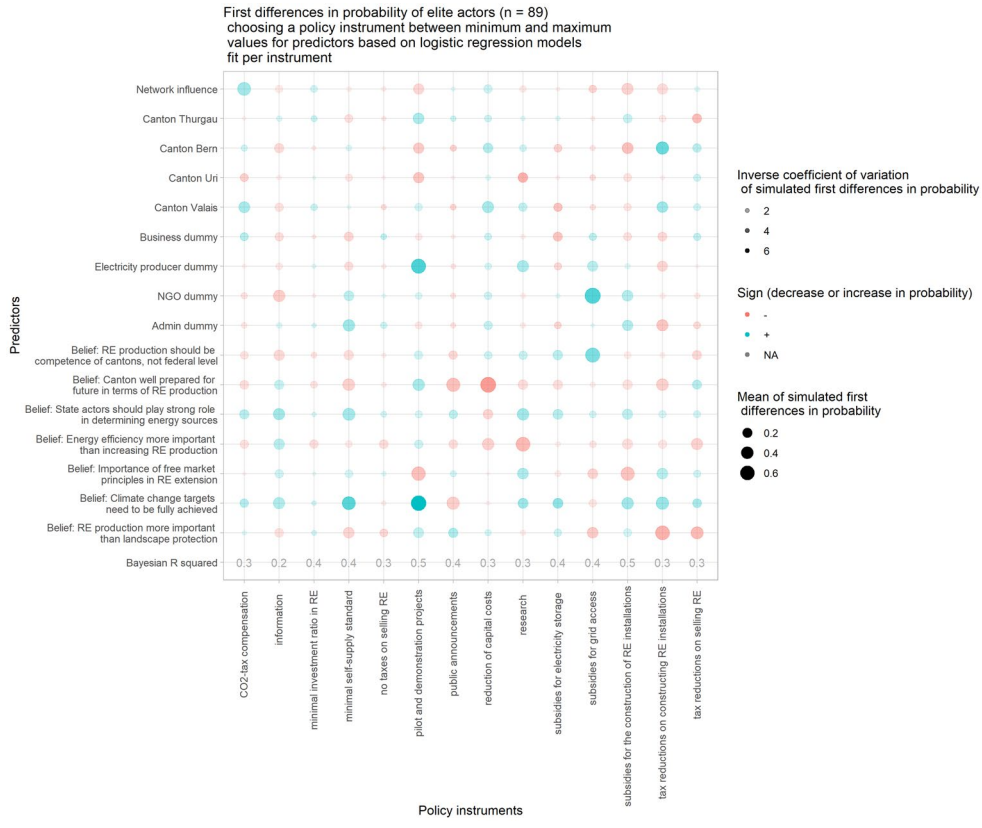

Figure 4. First Differences in the Probability of Choosing a Policy Instrument Between the Minimum and Maximum Values for Predictors Based on the Binomial Logistic Regression Model Fit Per Instrument. *Note:* The size of dots indicates the amount of difference in probability, color indicates an increase or a decrease, and transparency indicates precision based on a characteristic of the posterior distribution. Reading example: the association between the belief that climate change targets need to be fully achieved (row) and the probability that a respondent supports the instrument pilot and demonstration projects (column) is such that there is an increase (blue color of dot) in the probability of roughly 0.6 (size of dot), with a relatively high precision (strongly plotted dot), in support of the instrument between a respondent who does strongly disagree with the target and one who strongly agrees, holding all other variables constant at their means. [Colour figure can be viewed at wileyonlinelibrary.com]

All models included the same predictors. The figure displays first differences in expected values (as the size of dots) for the probability of choosing a given instrument (each column represents one model) between the minimum and maximum values of each predictor included in the model (rows), holding all other coefficients fixed at their mean values. The expected values are the means of 1,000 simulation runs based on the logistic regression model fit to the data. For example, for the belief landscape, this means that the size of the dot indicates the difference in the probability of an actor with a maximally strong preference for landscape protection choosing a given instrument, compared to an actor with a maximally low preference for landscape protection. The figure also gives an indication of how credible these simulation-based mean expected values are by plotting credible values more strongly according to the inverse coefficient of variance of their posterior

distribution. Higher values on the coefficient of variance indicate lower values for the standard deviations in the distribution of simulated expected values relative to the size of the means, indicating higher precision. We also supply a Bayesian R-square (Gelman, Goodrich, Gabry, & Vehtari, 2019) for a condensed measure of overall model fit for every model.

Below, we single out specific effects of beliefs on the likelihood of choosing some instruments we deemed especially noteworthy.

For the implementation of pilot- and demonstration projects (an instrument that primarily aims to help new technologies transition from experimental stages to the market) the notion of a free market in the domain of renewable energy policy and the belief in the urgency of climate change play particularly important roles. Elite actors that consider a free market to be an important goal that should be achieved in the sector are more reluctant to accept an instrument that in principle is a subsidy for the introduction of a new technology in the market. Moreover, elite actors that emphasize climate change to be of pressing concern opt for this type of market intervention. Furthermore, utilities support pilot- and demonstration projects more than the reference group. This is not surprising, according to an interviewed utility-representative, because they are usually partners in collaborations that are established for the implementation of such projects. It is thus encouraging that elite actors who are central for future technology development are aware of the policy instruments supporting such developments.

The belief in the importance of a free market and the urgency of climate change also play out in similar fashion when it comes to the preference for more general subsidies for the construction of installations producing renewable electricity. This relatively strong policy instrument, which nevertheless is seen by some as distorting markets, is favored by elite actors intent on combating climate change, but not by elite actors who believe in the importance of free markets. Interestingly, utilities are more eager to support pilot- and demonstration projects, but less inclined to favor subsidies on constructions. According to our interview partners, the reason for this is that it introduces small-scale and decentralized competitors that might hurt the current de facto monopoly of the larger energy producers (SFOE, 2013). Additionally, whether elite actors prioritize increasing energy efficiency over energy production plays a role in the formation of policy preferences regarding subsidies. The effect of this belief is intuitively plausible because these elite actors will try to divert resources into instruments that promote efficiency rather than the production of renewable energy.

When it comes to the distribution of information as a policy instrument, there are no policy beliefs that play a particularly distinctive role. The largest and credibly negative effect pertains to environmental E-NGOs which support the distribution of information less than the reference group. According to our interview partners, E-NGOs consider this instrument as too weak, and the commitment of a canton to information-based instruments as not sufficient for the achievement of their preferred goals. Consequently, they opt for more powerful instruments that have a larger impact.

Distinct effects of policy core beliefs on policy preferences regarding a single instrument can be observed with regard to a mandatory partial self-supply regulation that forces owners of new buildings to provide a certain amount of electricity on their own (e.g., with photovoltaic panels). Elite actors who perceive that their respective canton is not ready for the future regarding the development of RE are particularly likely to consider this strong instrument to be an option for implementation. Because it is a strong regulatory instrument, it is also not surprising that a belief in a large role for the state also increases the likelihood of an actor favoring this instrument. We can further observe a strong strong positive effect of the belief in climate change.

Administrative actors are especially likely to be in favor of mandatory partial self-supply regulation as a policy instrument. This is due to their more technocratic position in the policy process and their broader knowledge about what is truly necessary to achieve the ambitious climate and energy goals formulated in the national energy strategy (blinded source). Moreover, administrative entities can expose themselves with more polarizing measures because they usually do not have to fear direct backlash from elections. Whereas this might be problematic from an accountability perspective, it enables these elite actors to push new and unconventional proposals into the political process. This is especially the case in Switzerland, where administrative actors are comparatively powerful during the instrument selection and implementation phases (Sager, 2014). Elite actors who prioritize landscape quality over the construction of new RE capacity are more likely to be opposed to mandatory partial self-supply regulation. This is plausible, as the instrument is likely to lead to a broad effect on landscapes, due to its distributed effect across many buildings and installations. The belief in free markets does have no clear effect on the preference for mandatory self-supply regulation. This finding is interesting because mandatory self-supply is a very coercive instrument that should presumably trigger resistance from elite actors who believe in a free-market economy.

There are also some interesting regional differences between the cantons: The cantons of Bern and Valais are more strongly in favor of tax reductions for the construction of RE installations than the other cantons. This might be because these two cantons already use this instrument and are familiar with it whereas the other three cantons have no such measure (Stadelmann-Steffen et al., 2018). Furthermore, the canton of Valais seems to be generally more favorable toward using policy instruments for RE promotion than the others. This finding is in line with other findings that demonstrate the French-speaking part to be more open toward state intervention than the German-speaking part of the country (Vatter, 2016).

4.2. Preference for an Overall Encompassing Instrument Mix

The model assessing the effect of policy core beliefs on how encompassing the preferred instrument mix should indentify the demand for state intervention and the importance attributed to climate change as the most influential beliefs. Figure 5 displays the results of the linear regression modeling.

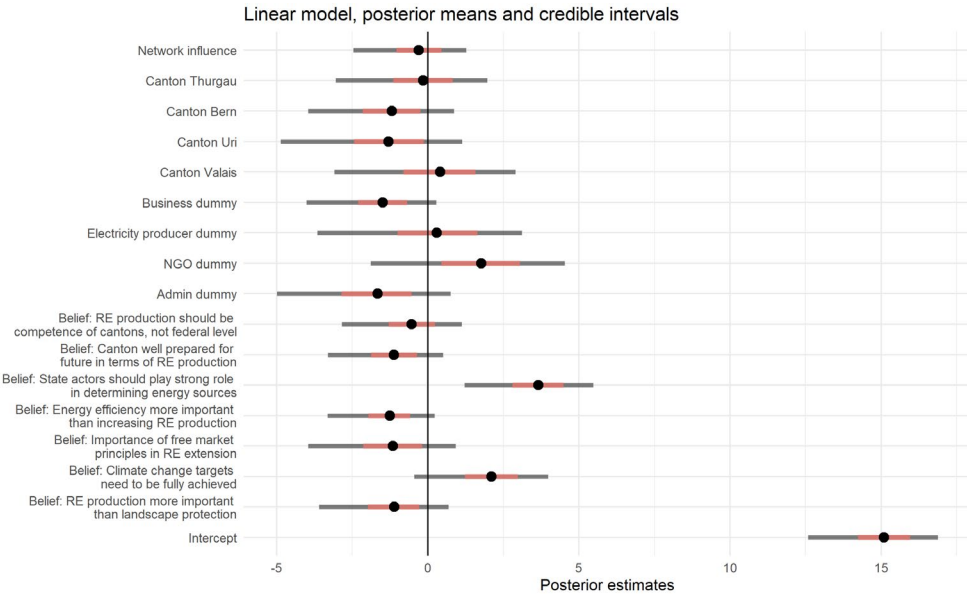

Figure 5. Credible Intervals of Parameter Estimates From Linear Regression Modeling of an Actor's Choices for an Encompassing Policy Mix (Positive Estimates Indicate a Tendency Toward More Encompassing Regulation).
Note: Black lines denote 95% credible intervals, red lines 50% credible intervals. [Colour figure can be viewed at wileyonlinelibrary.com]

Unsurprisingly, our results warrant the conclusion that a strong belief in favor of state intervention is positively associated with preferences for a more encompassing instrument mix. This association is plausible because the instrument mix variable is constructed in a way that it does not distinguish between different instrument types. In other words, the index increases by the same amount for each instrument and does not attribute more weight to stronger instruments. The desire for state intervention in energy policy is a rather general policy core belief that does not necessarily conflict with considerations regarding the instrument type.

The second policy belief with a credible positive influence on the preference for an encompassing instrument mix pertains to climate change. Elite actors who believe climate change to be an important problem tend to favor a more encompassing instrument mix. The effect is quite strong, and we can be relatively sure that it is stronger in magnitude than most other factors we considered. For most other policy beliefs our results suggest less convincing evidence for a substantial effect on preferences in favor of a encompassing instrument mix, as the credible intervals of the posterior distributions for parameter estimates contain positive as well as negative values, and the effect sizes suggested by most estimates within the credible intervals are relatively small.

A third policy belief (future) exhibits a credible negative influence on the preference for an encompassing policy mix. Elite actors who believe that their respective canton is already well prepared for future challenges in the energy sector prefer a weaker instrument mix than more pessimistic elite actors do.

The control variable for network influence has no conceivable influence in any of the models we specify. Secondary aspects of collaboration partners of elite actors do not influence actors' own preferences in our case. We would, however, stop short of drawing strong conclusions from this finding, as the effects of influence are likely to play out over longer periods and are less likely to be observed in a cross-sectional study, such as ours. Further, collaboration networks among elite actors involved in RE policy in the five cantons we studied are relatively inclusive, with no apparent opposing subgroups, which, if present, could have led to a stronger influence effect.

4.3. General Discussion of Influence Pathways

On a general level, our models show that policy core beliefs have distinct effects on policy preferences. This leaves our results in accordance with current literature on the subject. In the particular case of Swiss renewable energy promotion, the policy core beliefs account for a substantial part of the variance in instrument preferences. However, the influence pathways between beliefs and policy preferences are far from as straightforward as a direct translation from beliefs into policy preferences.

Two main ways have emerged in which policy core beliefs influence policy preferences. First, some policy beliefs translate directly into specific policy preferences but do not influence the overall characteristics of the instrument mix. In our case, this mostly applies to the belief in the importance of free markets, which does heavily influence the preferences for instruments that are thought to influence market dynamics. However, the effect of the free-market belief does not decisively influence the preference for an encompassing instrument mix. Thus, free-market beliefs have a stronger influence on the preferred choice of regulation, but not necessarily on its overall level. Second, some policy beliefs have a strong effect on the overall characteristics of the instrument mix. This higher-level effect is not accompanied by a likewise, lower-level influence of such beliefs on specific instrument preferences. For the case of Swiss RE promotion, a higher-level effect mostly applies to the desired level of overall state involvement, which heavily influences the overall preference for an encompassing instrument mix, but not the preferences for specific instruments, except mandatory self-supply. A third way, which we did not explicitly expect is illustrated in the belief in the urgency of climate change, which affects not only the preference for an encompassing instrument mix, but also almost every single preference regarding specific instruments. Such types of beliefs are especially important in shaping the policy process.

Overall, the results paint a picture of the translation of policy core beliefs into policy preferences/secondary aspects that is relatively complicated. However, it follows some characteristics that can be derived from policy theory or case knowledge.

5. Conclusion

The rapidly increasing pressure on policymakers—elected officials, but also administrative entities—to enable the deployment of renewable energies in Switzerland has led to an intense and sometimes harsh discussion on both the national and

cantonal levels. The Swiss cantons are currently, in 2020, still deciding on what specific measures they will use in order to achieve the ambitious goals set in the new national energy strategy. It is, therefore, essential for policymakers as well as scholars to understand the underlying factors that lead to the selection of specific combinations of instruments. In our analysis, we find that policy core beliefs translate into preferences through a process involving two main pathways. On the one hand, some policy beliefs primarily influence the preferred characteristics of the overall instrument mix. On the other hand, other policy beliefs are primarily associated with preferences for specific instruments. The third type of influential policy beliefs influences both to the same extent and therefore, emerges as especially important factors shaping the policy process.

Beyond the influence of beliefs, we also find that preference formation is dependent on the role of different types of elite actors in the policy process. More precisely, elite actors support instruments when they can draw profit from them. For instance, utilities are often part of conglomerates testing innovative technologies for the production of RE in pilot- and demonstration projects. Therefore, they will receive funding from subsidies should they be implemented, which is especially relevant for the development of new innovative technologies. Administrative entities and ENGOs also have distinctly different instrument preferences regarding minimal standards, or the distribution of information, respectively, than other elite actors. It is thus essential for policymakers to previously assess the beliefs of various elite actors involved in the policy process to anticipate a potential rejection of specific measures. A central actor group that might be crucial for instrument choice is elite actors expressing a strong belief in a free-market economy. As our results show, these elite actors reject the implementation of instruments with a strong effect on market structure (subsidies or the support of pilot- and demonstration projects). However, their belief in a free-market economy does not have a discernible effect on other instrument preferences such as information or a mandatory self-supply regulation. Thus, it might be essential for policymakers to identify these elite actors and get their support to form majorities.

The general belief in state intervention in the domain of energy policy has emerged as the most essential driver influencing the overall characteristics of the instrument mix. Proponents of state intervention generally propose more encompassing instrument mixes. However, a belief in state intervention does not lead elite actors to favor specific instruments over others. Assuming that in a specific setting (e.g., in a country) policy instruments need to be implemented to achieve a certain target (e.g., increased RE production) it is thus essential for policymakers to identify elite actors that show a strong belief in general state intervention in order to push a specific instrument through the policy process. It might be the case, though, that there are no or few such elite actors active in a policy subsystem. Policymakers would then have to find other options to convince a majority for new instruments such as implementing weaker measures than planned (i.e., with a low degree of state intervention such as voluntary labels) or by offering tit for tat deals where opposed elite actors can profit differently (i.e., by dropping a policy instrument they are opposed to). Should the situation arise in which major elite actors (e.g., a majority of political

parties in parliament) do not support new instruments and do not see that they can profit from these instruments, then one might have to accept that there is currently no room for maneuvering.

On a theoretical level, our findings show that the level of abstraction plays an important role in the assessment of the link between policy core beliefs and instrument preferences. This finding is crucial for the conceptualization of studies focusing on coalition formation, as well as the determination of policy change and learning in ACF applications. As we have shown, specific instrument preferences are mainly determined by relatively closely related policy core beliefs such as the "free-market" belief and preferences for instruments influencing market conditions. This is also the case for beliefs on a higher level such as the general desire for state intervention in the policy sector that only influences how encompassing the instrument mix is. It is, therefore, relevant for researchers to clearly distinguish their level of abstraction in any study they conduct that investigates factors shaping instrument choice. The implications are especially relevant to ACF studies mixing individual and coalition levels. Results derived from such studies and their interpretation stand or fall with the conceptualization of policy core beliefs and secondary aspects. For example, a strong belief in free markets might not have a distinct effect on how encompassing the instrument mix is overall; however, it might still be relevant for specific elements (i.e., instruments) within this instrument mix. In that hypothetical case, it would, therefore, be a misinterpretation of results to discount the effect of the free-market belief as irrelevant.

We want to point out that instrument choice can also be affected by a third belief level (deep core beliefs), which provides a more fundamental normative basis for the other two levels. Our research is in line with other findings, which found that especially policy core beliefs shape policy preferences (e.g., Weible et al., 2015). However, deep core beliefs could still play an underlying role that we were not able to detect so far. We must, therefore, put more effort into the conceptualization of the three belief levels and build a more systematic approach to the assessment of how they are related to each other.

Finally, our work shows the importance of policy-oriented beliefs for instrument choice. The increase in RE production is one of the main pathways to a more sustainable energy system and thus to climate change mitigation. With the analysis of beliefs, we give policymakers and other actors involved in the RE sector the opportunity to anticipate potential future conflicts in negotiations about policy proposals. Since beliefs are more stable and long-lasting than policy preferences, considering them provides a way to anticipate, attenuate, or even avert these conflicts.

Lorenz Kammermann is a lecturer at the Department for Political Science at the University of Bern, Switzerland. Lorenz specializes in energy, sustainability (2030 Agenda), development cooperation, and technology issues and does research with a focus on theories of the policy process.

Mario Angst is a post-doctoral researcher at the Department for Economics and Social Sciences at the Swiss Federal Institute for Forest, Snow and Landscape Research WSL. Mario explores sufficiency policy, environmental governance, and governance networks.

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Appendix A

Table A1. Operationalization of Variables

Variable	Survey Question/Statement	Response Options	Operationalization
Single instruments: • reduction of capital costs, • CO_2-tax compensation • information • tax reductions on constructing RE installations • tax reductions on selling RE • minimal investment ratio in RE • no taxes on selling RE • pilot and demonstration projects • public announcements • research • minimal self-supply standard • subsidies for grid access • subsidies for the construction of RE installations • subsidies for electricity storage	Please indicate whether the following measures should primarily or secondarily be employed for the promotion of RE in the canton of ___	Primary measure; secondary measure; measure should not be employed	Discrete scale from 2 (primary instrument) to 0 (instrument should not be used). Dichotomized in the logistic regression analysis by setting values of 2 to 1
Policy_mix	Please indicate which of the following measures should primarily or secondarily be employed for the promotion of RE in the canton of ___	Primary measure; secondary measure; measure should not be employed	Additive index; primary measures receive value 2; secondary measures value 1; measures that should not be used 0
Landscape	The expansion of RE production should be prioritized higher than landscape protection	Fully agree; mostly agree; mostly disagree; fully disagree	Discrete scale from 1 (fully disagree) to 4 (fully agree); inverted in model
Climate	Climate change targets (e.g., reduction of CO2 emissions) should also in the future be fully achieved	Fully agree; mostly agree; mostly disagree; fully disagree	Discrete scale from 1 (fully disagree) to 4 (fully agree)
Free_market	The extension of RE production should be determined by a free market	Fully agree; mostly agree; mostly disagree; fully disagree	Discrete scale from 1 (fully disagree) to 4 (fully agree)
Efficiency_before_production	Increases in energy efficiency should be prioritized higher than the extension of RE production	Fully agree; mostly agree; mostly disagree; fully disagree	Discrete scale from 1 (fully disagree) to 4 (fully agree)

(Continues)

Table A1. (Continued)

Variable	Survey Question/Statement	Response Options	Operationalization
Future	In comparison to the other cantons, the canton of ___ is well prepared for the future regarding the production of RE	Fully agree; mostly agree; mostly disagree; fully disagree	Discrete scale from 1 (fully disagree) to 4 (fully agree)
Subsidiarity	The expansion of RE production should primarily be in the competence of the cantons. [and not of the national level]	Fully agree; mostly agree; mostly disagree; fully disagree	Discrete scale from 1 (fully disagree) to 4 (fully agree)
State_mix	State actors should determine the energy sources that produce energy in the canton of ___	Fully agree; mostly agree; mostly disagree; fully disagree	Discrete scale from 1 (fully disagree) to 4 (fully agree)
Collaboration	Please check all actors that you collaborated closely with during the revision of the ___ act independently whether you agreed on the subject or not	Strong collaboration; no collaboration	1 = strong collaboration 0 = no collaboration

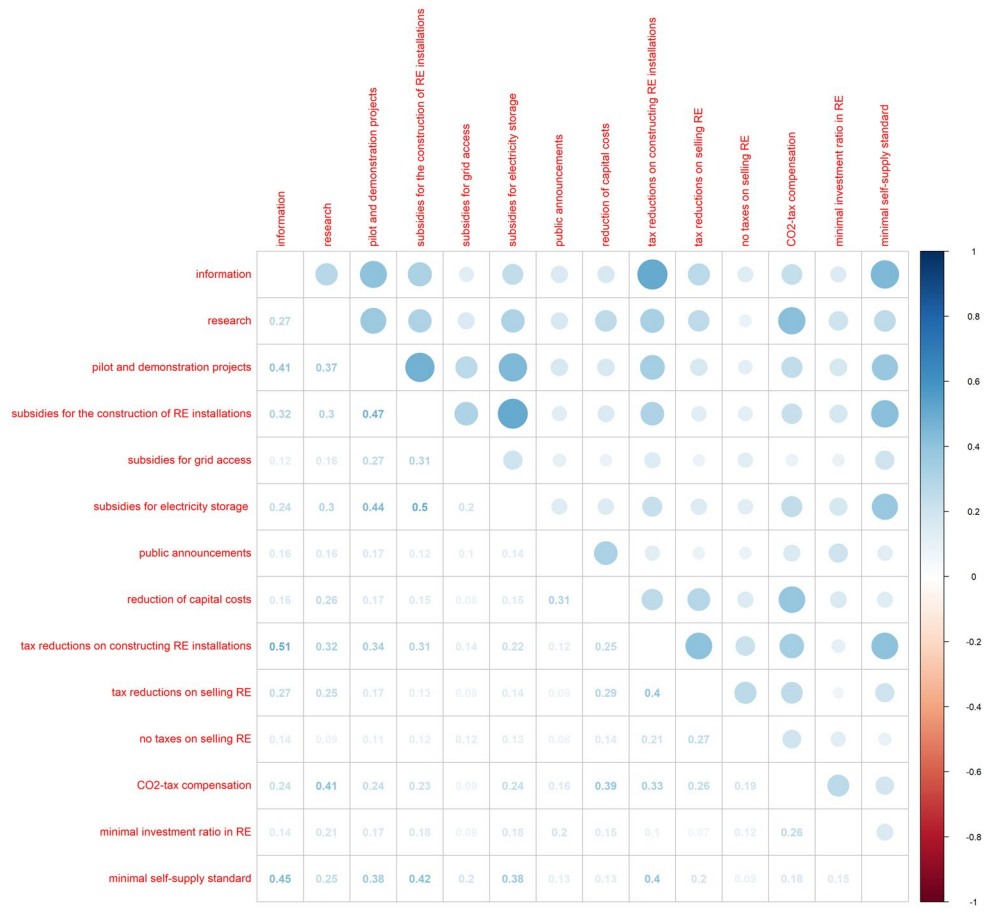

Figure A1. Pairwise Jaccard Similarity Between Responses for All Instrument Variables. [Colour figure can be viewed at wileyonlinelibrary.com]

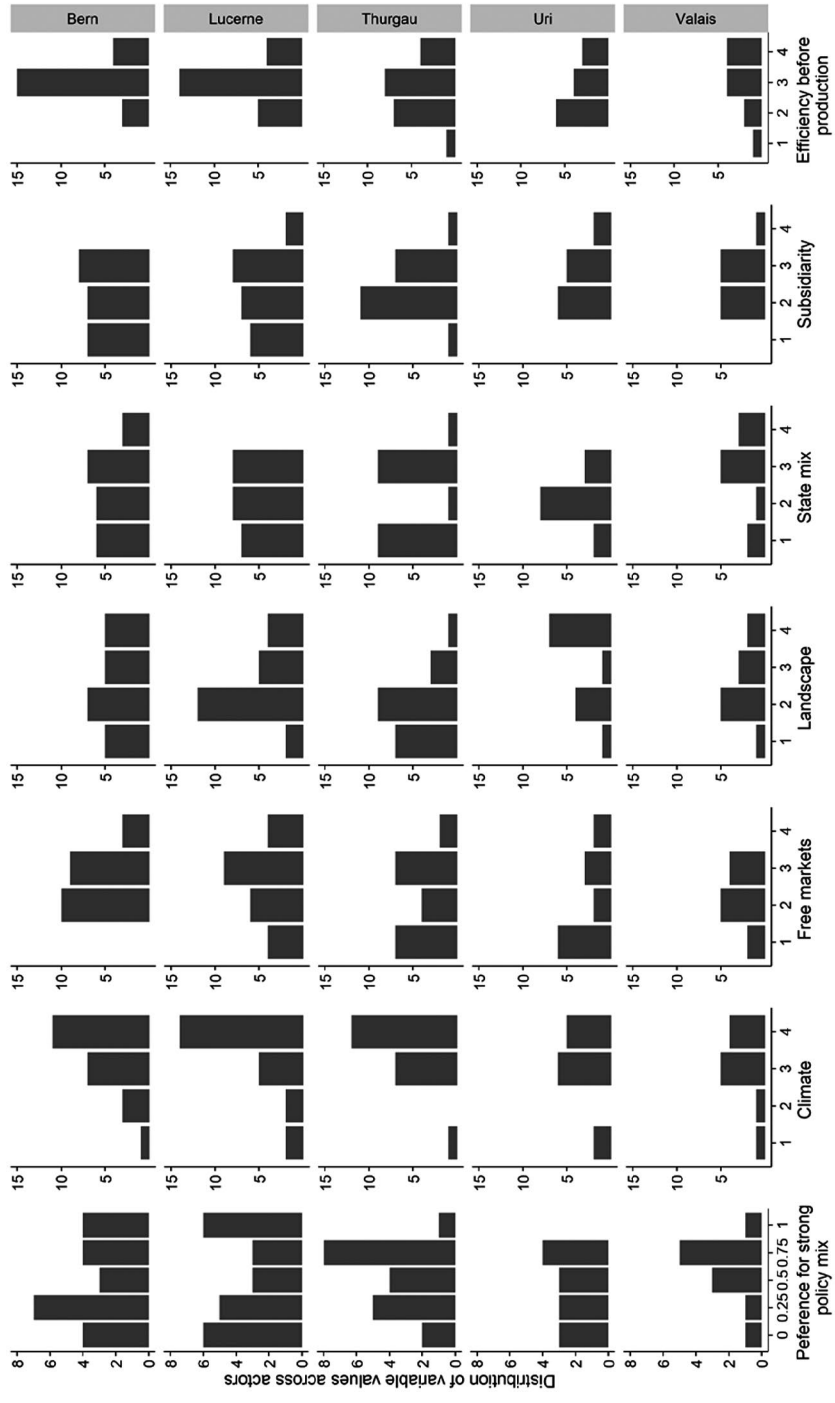

Figure A2. Distribution of Instrument Mix Preferences and Policy Core Beliefs by Canton.

Table A2. Descriptive Statistics of Policy Belief Variables

Variable Name	Min	Max	Mean	Standard Deviation	Variance
Landscape	1	4	2.44	1.02	1.04
Climate	1	4	3.29	0.91	0.82
Free market	1	4	2.39	0.96	0.92
Efficiency before production	1	4	2.91	0.75	0.56
State mix	1	4	2.22	0.96	0.92
Future	1	4	2.80	0.79	0.62
Subsidiarity	1	4	2.35	0.83	0.68