Part III
EMPIRICS

Chapter 5: Mapping implementation arrangements of Swiss wind-energy projects

As a first deep-dive into the empirical part, the present chapter offers a detailed descriptive account of the objects of analysis — the Swiss WE-procedure, its involved actors and the existing WE-projects. Its function is to set the stage for the inferential analyses to follow thereafter. At the end of the chapter, the reader will have a firm grasp of the WE-authorization procedure, its institutional and political embedment and the state of Swiss WE more generally. Based on the analytical model of this study (see figure 2.2), figure 5.1 shows which aspects of the model this chapter focuses on. It tells the reader to expect an outline of actors in arrangements, policies and institutions, without, however, incorporating the links between them, for now.

In the first section (5.1.), I set up the chapter methodologically by briefly showing the methods and data resorted to in this descriptive chapter. In section (5.2.) that follows thereafter, I explain to the reader how the permitting of large-scale WE-projects works in Switzerland. In section 5.3., I will give the reader an overview over the existing WE-projects in Switzerland by presenting the most important facts and figures. Subsequently, section 5.4. characterizes the actors that are involved in these procedures, focusing on the main public organizations, cantons and municipalities, but also elaborating on the more tangential ones. The next section (5.5.) then outlines the role of political parties. A final section (5.6.) then discusses mean and summed actor positions and relations in Swiss WE-implementation arrangements.

5.1. Methods and data

In this chapter, a variety of primary and secondary data is drawn upon. To explain the design of the authorization procedure and the actors, mostly laws, ordinances, legal commentaries and spatial planning concepts are relied on. For the facts and figures given in the overview, data from this study's original Project Characteristics Survey (PCS) is used (for all modalities, see section 7.1.1.). For relational statements referring to the relative positioning of actors, data are taken from this study's other original survey called the "Network Characteristics Survey" (NCS; for all modalities, see section 6.1.).

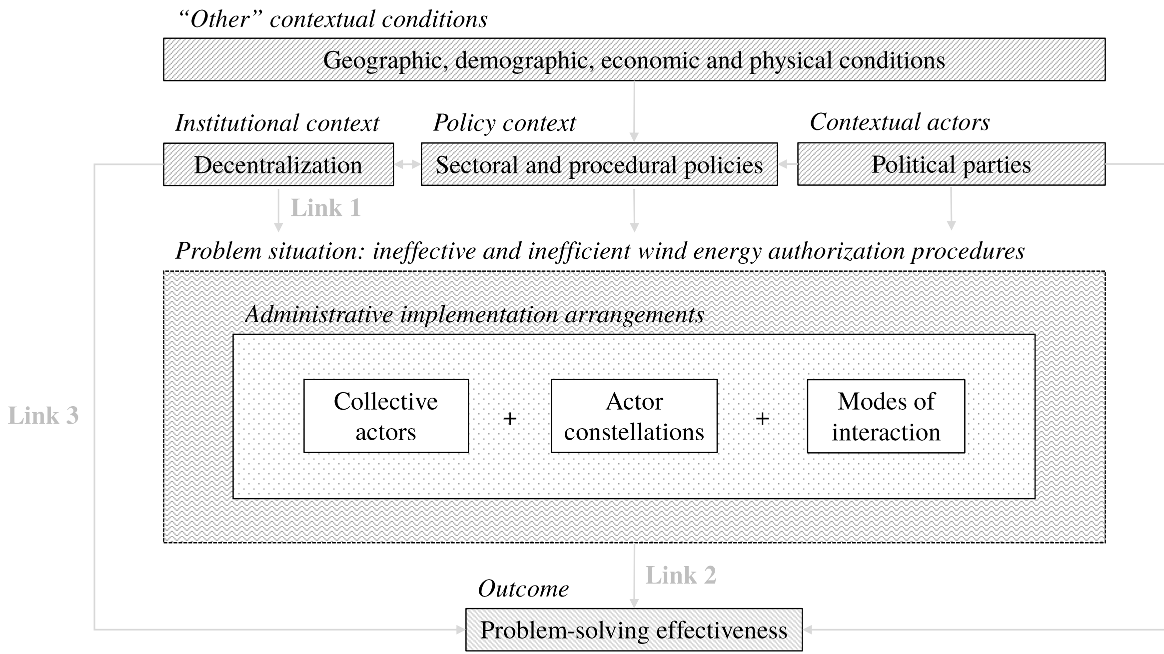
The term of actors is used as synonym to organizations in this chapter, even though, strictly speaking, organizations are a subgroup of composite actors (see section 2.2.1.). The population of both surveys includes WE-projects, whose met mast[110] authorization was received by potential developers between 01.01.1998 and 31.12.2018. The cut-off date for measures of duration was the 31.12.2021. As compared to the other empirical chapters, this chapter also uses interview data that are primarily used to illustrate and emphasize arguments.

The latter data stem from 20 interviews, held between 14.10.2020 and 01.04.2021, mostly using video-conference software due to the pandemic's meeting restrictions at the time. Two were held by phone, in a conference call, without video transmission. Table A in the online appendix numbers all the interviews by date. Due to the high political saliency of the issues, most interviews were held anonymously, which is why no additional information on the interviewees is disclosed. Interviews followed the semi-structured standard, following Adams (2015), and lasted from 45 minutes to 2.5 hours each. All stakeholder categories except municipalities (confederation, canton, NGOs, developers) took part. The first part of the questions was adapted to each respondent's WE-project, and the catalogue was prepared for each interviewee based on her stakeholder category, the number of projects involved and the specificities of these projects. This first part of the questions was thus highly individualized. The second part of the interview consisted of standardized questions. Only project labels were exchanged in this second part, resulting in comparable statements between stakeholder categories. All interviewees were requested to speak on behalf of their organization. If this was not possible, they were asked to respond in their professional function. There were one to three interviewees present in each interview. The student research assistant assigned to helping out with the empirical part of the study and I were present as interviewers.[111] I indicate the number of the interview when illustrating an argument with interview data.

110 This is a machine that measures wind speeds and direction, thereby assessing a site's suitability for the construction of a wind turbine.

111 For those interviews that we were allowed to record and allowed to transcript, transcripts were made and anonymized. Yet given that they still contain project information, the interviewee can be identified based on statements by people with knowledge of the project. For this reason, none of the transcripts or interview notes are included in the online appendix or available upon request.

Figure 5.1: Chapter 5 focus in the present study's analytical model.



Notes: Analytical categories indicated by rectangular boxes with different shading per category, labels in italics, material content in regular font, links of correlational association in bold font; grayed out is what is out of focus in this chapter.

5.2. On the way towards a permit: competences, procedural stages and phases

This section explains how the authorization procedure for WE-projects has worked in Switzerland in detail. With a view to the recent climate urgency, some propositions have already been made on how to change it. The most encompassing to date has been Aemisegger and Marti's (2021) ARE-commissioned proposition of further centralization of spatial planning competences and the cutting of municipal LLUP decision competences. However, as the "shadow of the future" dictates, profound policy changes take time. Given that planning procedures tend to be defined at roundtables at the starting point of a project unless there are changes of laws and ordinances, in which case the procedure of an ongoing project is adapted, this section follows the current state of the federal and cantonal procedure, as of the cut-off date of 31.12.2021. It proceeds as follows: First, the distribution of competences between the Federation and the cantons in the fields of energy, environment and spatial planning is discussed (section 5.2.1.). Thereafter, the federal legal provisions that set the cantonal margins of action of the WE-authorization procedure are elaborated upon (section 5.2.2.). Subsequently, cantonal differences in WE-authorization procedures are presented (section 5.2.3.).

5.2.1. On the distribution of competences in the fields of energy, environment and spatial planning

Until the nuclear law in 1959, energy had been an exclusive cantonal domain of competence (Sager 2014). In current Swiss energy politics, however, the distribution of competences has been very much a matter of debate (Schaffhauser and Uhlmann 2014, 1729). Even the federal courts have called it "highly complex" (BGE 1C_36/2011; see also Weber and Kratz 2005, 83). But any account of energy policy competence distribution must start with the principles: Articles 89 to 91 of the Swiss constitution (BV) allocate organizational competences to the various levels of government.[112] The federal legislator is accorded the framework legislation competence

112 The Federal Act on Energy (EnG) and its ordinances, the Federal Act on Electricity (EleG) and its ordinances, and the Federal Act on Electrical Power Supply (StromVG) and its ordinances present the main source of federal positive law on electrical energy. All these laws derive their legality from Art. 89 BV, the first of the three

("Grundsatzgesetzgebungskompetenz") regarding the use of domestic and renewable primary and secondary energies and on matters of parsimonious and rational consumption (Art. 89 para. 2 BV; see Schaffhauser and Uhlmann 2014).[113] The federal level of government is further competent in setting and controlling efficiency standards, with the exception of efficiency in buildings. The competence of promoting new energy technologies is shared (Art. 89 para. 3 BV). Cantons are especially ("vor allem") competent concerning the use of energy in buildings (Art. 89 para. 4 BV). However, neither does this formulation connote that cantons are the only ones to be competent to actively set rules on the matter of buildings, nor does it found a competence for the federal state to actively regulate it (Schaffhauser and Uhlmann 2014). These constitutional articles lead to a complicated mixture of interdependences between the involved actors: In practice, various degrees of legislative power are accorded in the energy sector (parallel, competing or exclusive etc.; see Tschannen 2007). The extent of competence may differ across the subdomains of energy production and distribution or across consumer or producer groups. Additionally, competence demarcations are not only complex "vertically", i.e. between levels of government, but also "horizontally", between the private and the public sector: According to Art. 6 para. 2 EnG, governments are responsible for framework rules, whereas energy supply is in principle a private sector matter.

For energy infrastructure generally, and wind turbines specifically, the federal level sets the larger principles of market regulation (capacity vs. energy markets; see Weigt et al. 2018; StromVG), defines a (non-exclusive) subsidy scheme (EnG) and sets the technical electricity standards (EleG). The actual construction of infrastructure, however, is governed by spatial planning regulations. For this latter policy field, the constitutional foundation (given in Art. 75 para. 1 clause 1 BV) accords the federal authorities the

---

"energy articles" in the Swiss constitution (BV). Art. 90 BV, the second of the constitutional energy policy articles, allocates the exclusive competence to regulate nuclear energy to the federal authorities. Art. 91 BV specifies that the federal state is solely competent in matters of electricity transport and liquid or gaseous fuels and propellants. The EnG aims at providing a diversified array of energies in a safe, sufficient, economical and environmental-friendly manner. The EleG dictates safety standards for electrical power installations, and the StromVG prescribes rules directed at enabling an efficient, safe and competitive electricity market.

113 A primary energy is considered to be the natural source of energy, e.g. solar radiation (resource). Secondary energy is the form of energy that is usable, after human-made transformation, e.g. electricity; see UN ECOSOC 2017.

framework legislation competence. Having such a framework competence means that the Federation is not only allowed to but *must* formulate regulatory principles for the entire policy field ("Sachbereich") of spatial planning (Griffel 2017, 13). This federal competence has already been present in the 1874-constitution (BV-old) since 1969 (as Art. 22quater; see ibid., 13), but it only gained concrete force when the Federal Act on Spatial Planning (RPG) was passed in 1979 and went into force in 1980. Nevertheless — and this is fundamental —, following Art. 75 para. 1 clause 2 BV, spatial planning regulation is first and foremost a cantonal competence, with the exception of overarching principles that are set by the Federation. However, if the planned WE-projects is to be constructed outside of a dedicated construction zone ("Bauen ausserhalb von Bauzonen"), which is most often the case (Aemisegger and Marti 2021, 17) because wind exposure is highest on hills that tend to be on the outskirts of villages, federal rules would govern exhaustively. However, in the standard case, through the creation of special construction zones ("Spezialbauzonen") the canton and its municipalities are in charge of designing and organizing the procedure, under the exclusion of the Federation. Still, for standard projects, the Federation further prescribes a detailed evaluation of a potential site (following Art. 1 and 3 RPG) and a cascade of subsequent planning instruments, which are triggered by the fulfillment of certain threshold criteria. Outside of regular or special construction zones, the Federation can also decide exhaustively on what forms of exploitation the territory can be subjected to, or what it can be used for (Griffel 2017, 14). Legal scholars agree that this high density of federal rules for projects outside of construction zones does not surpass the framework legislation competence, as this competence only requires a low density of federal rules for construction inside regular or special construction zones, not outside of them, where higher density is not only allowed but wanted (ibid., 14).

In contrast, with regard to the policy field of the environment, the federal authorities have been attributed exclusive legislative powers (ibid., 15), invalidating contrary and previously existing cantonal rules on the matter ("nachträglich derogatorisch"; see Spiess 2016). However, the scope of "the environmental law" is to be understood as limited, as, for example, the federal authorities only have a framework legislation competence with regard to protecting forests (Art. 77 para. 2 BV) or in fishing and hunting (Art. 79 BV). Departing from a broader understanding of what "the environment" consists of, and in line with potential impacts of wind turbines on forests and fauna (biodiversity), legal competences on WE-relevant environmental aspects are scattered on multiple levels of government.

The picture is somewhat changed if one moves the focus from legislation to implementation: Following Art. 46 BV, cantons are in principle held to implement policy rules set by the federal state. This means that, in addition to implementing policies stemming from their own parliaments, they are required to implement policies from fields where they do not already have (degrees of) legislative competences, such as, e.g., the environment. Hence, the constitution charges the cantons to define implementation rules within federally accepted margins of maneuver (see Linder 1987; Linder and Mueller 2017 and section 3.2.1.). Cantonal executives are free to implement their own policies within the boundaries of the federal legislation and their own cantonal constitutions and laws. Moreover, cantonal implementation is severely constrained by the already existing stock of implementation solutions that cantons have (not) found for cantonal and federal legislation. As the sections on the Swiss specificities of implementation (section 3.2.1.) and their influence on policy-making (section 3.3.1.) have shown, the foreseeability of how a novel federal policy shall be cantonally implemented is practically non-existent (1987, 218f.). This is equivalent with concurring that a large role in creating implementation outputs and outcomes must be credited to administrative politics. The strength of administrative politics considerations has received strong empirical support for spatial planning: For example, Delley (1980) and Müller-Jentsch and Rühli (2010) have both found that the cantons have (over)stretched their implementation freedoms due to individual geographical, political and resource considerations.

However, concretely speaking, what is under consideration in the present study is not the general distribution of legislative and implementation competences. Rather, the study treats the specific implementation question on how authorization procedures of WE-projects in Switzerland work. Designing such an authorization procedure requires fulfilling (and creating) legal rules stemming from the energy and environmental policy fields, with spatial planning policy coordinating them. Thus, the set-up of implementation could be summarized as follows: Many actors are involved, with different margins of maneuver, coming from different policy fields, acting based on rules from different sources (levels of government) and a strong role of administrative politics, while being heavily constrained by institutional factors that embed these actors.

5.2.2. The authorization procedure as governed by federal law

This section presents the federal framework of legislation that sets out the permissible margins of action for cantons to design their own WE-authorization procedures. It aims at defining a typology of WE-projects that serve as the population for this study's surveys. The section will further graphically summarize the procedure based on federal legal dispositions, providing the terminology to describe and analyze the procedure thereafter.

Technical basics

Regulatory requirements in the authorization procedure vary with the size, location, number of turbines and with other characteristics of WE-projects. The turbines come in various sizes: There are turbines attached to roofs of regular buildings or placed in gardens; they are 1–5 meters in size from ground to outermost point of rotor blade with an installed capacity in the lower single-digit kW's. Then there are medium-sized ones up to 30m in total height with a capacity of a few to about 55kW.[114] There are also large ones from 30m in total height to well over 200m, with a capacity between anything from 500kW[115] to 7.6MW.[116] As onshore turbines tend to be smaller, the current record in size and capacity (as of July 2022) went to a offshore prototype turbine in Danish waters by producer Vestas, measuring 280m in total height, with a capacity of 15MW (Memija 2022).

In Switzerland, for economic reasons and due to the gains in energy needing to be proportional to the environmental impact, no commercial wind turbines are built between approximately 30m to 120m in total height.[117] Regarding how primary energy is transformed into electricity, many different technologies are available, yet only one is commercially relevant in the current Swiss case: horizontal-axis wind turbines. Normally, these contain three rotor blades attached to a nacelle (the gearbox and generator) that is mounted at top of a tower. The nacelle turns in response to the direction of wind. Because the tower tends to be high, the nacelle and rotors heavy, the wind strong and blade rotation fast, the laws of physics require a stable foundation in the ground. In terms of materials of conventional, commercially-available

114 Enercon E-15 (Bauer and Matysik 2023b).
115 Enercon E-40 (Bauer and Matysik 2023c).
116 Enercon E-126 (Bauer and Matysik 2023a).
117 Thanks to Katharina Meyer, BFE, for pointing this out.

turbines, the towers tend to be made of steel lattice, the nacelle is mostly mechanical and electrical parts in a steel housing, the rotors are made of fiberglass-composites (Andersen et al. 2014; Eymann et al. 2015), and the large tower foundation is made of steel-wired concrete in different foundational shapes (Mohamed and Austrell 2018). Most parts can be recycled, and it is expected that the recycling industry will soon extend its capacity and refine the current technologies to recycle fiberglass-composites (Andersen et al. 2014).

Planning a wind turbine under federal law

Following the latest version of the federal spatial planning concept[118] of wind energy, the principle of concentration is imperative: Environmental impact is minimized and energy gains maximized if there are multiple turbines in a single location (ARE 2020a, 3). But the concept leaves it to the cantons to decide what this concentration criterion means concretely. In their structure plans, some cantons foresee a minimum of three turbines to fulfill it, others have not set criteria, leaving the cantonal importance of this federal planning principle open (ibid., 3). Planning in a concentrated manner is further abetted by the attribution of the label of “national interest” attached to projects (following Art. 12 EnG and Art. 9 EnV) that reach at least 20GWh per annum of electricity production. Single turbines cannot reach this amount of production, unless the addition of a single turbine makes the entire wind park surpass said threshold. Getting a “national interest” label is important for the balance of interests, because it equalizes the value of the production of electricity from larger WE-projects with other national interests of the federal state, i.e. regarding military, communications, meteorological, natural and built environment interests. In the absence of the attribution of a “national interest” label given to WE-projects, other national interests take precedence or are prioritized in spatial planning interest balancing (incl. in possible judicial treatments of the case). In Switzerland, the number of turbines planned ranges from 1 (e.g. “Tannenberg” in SG) to 19 (“Montagne de Buttes” in NE).[119] The maximum number of already built turbines is 16 in the “Juvent”-project on the Mont-Crosin (BE), where further enlargement on the East (“Jeanbrenin”) is currently under way. Switzerland, at the time of

118 “Concept” in the sense of Art. 13 RPG; see ARE 2020b.
119 As of July 2022; see SL Schweiz et al. 2020.

writing, hosts 41 wind turbines in total (excluding roof-attached, garden and total size <30m turbines) across 12 different locations (Wind-Data.ch 2023).

Regulatory requirements are adapted to a turbine's and a project's prospective impact on the natural (incl. human) and built environment.[120] Regarding the necessary spatial planning instruments, federal authorities have maintained that the threshold for requiring fixation in the Cantonal Structure Plan (CSP, "kantonaler Richtplan") is a total height (incl. rotor blades) of larger than 30m above ground (ARE 2020b). A CSP functions as the main instrument of territorial strategic development of cantons (title 2, chapter 1 RPG). Construction projects with "grave" consequences on space and environment ("gewichtig", Art. 8 para. 2 RPG) need to be "fixed"[121] in this planning document on a level of principles and strategies, but not in high granularity of detail. A CSP is binding for public authorities ("behördenverbindlich", Art. 9, para. 1 RPG) but not for landowners. The plan and each of its changes must be approved by the federal agency of spatial development (ARE) before it becomes binding for public authorities.

If a project is below 30m in total height above ground, a CSP-fixation is not needed. This is empirically rare, but in this case only a local land-use plan (LLUP, "Nutzungsplan", title 1 chapter 3 RPG) is needed. Its purpose is to regulate the "acceptable use of soil" in detail and in legally binding manner for authorities and landowners (Art. 14 para. 1 RPG and Art. 21 para. 1 RPG). In terms of planning logic, it follows sequentially after the CSP. These LLUPs must define territorial zones for construction and agriculture and designate territories for protection (Art. 14 para. 2 RPG). In principle, cantons define who is in charge of elaborating and deciding upon them (Art. 25 para. 1 RPG) within their jurisdictions. A LLUP is necessary for all WE-projects independent of total height, unless it can be argued for small (<30m) WE-turbines that they pertain to a specific site ("standortgebunden"), following Art. 24 RPG. In this case, an "exceptional" construction permit

120 Technically speaking, each turbine must receive a separate construction permit. However, all planning instruments and environmental considerations are made in concertation with the project's other envisaged turbines in the same location. In consequence, the study refers to a WE-project as containing all turbines in the same planning location. Moreover, as the construction permits tend to be handed out simultaneously for the same project, the study employs the term of construction permit only in the singular form for a WE-project.

121 Sites in the CSP are "fixed" if they have reached the highest of three stages of coordination advancement ("Festsetzung"). The first stage is entitled "preorientation" ("Vororientierung"), the second "intermediate result" ("Zwischenergebnis").

("Ausnahmebewilligung") would be necessary that is governed predominantly by federal rules because it is outside of regular or special construction zones that are governed predominantly by cantonal rules.

Because a new WE-project in a new location rarely to never complies with the zoning requirements ("nicht zonenkonform"), smaller and larger turbines that cannot be permitted with an exceptional construction permit, e.g. for reasons of environmental impact, must forcibly undergo a LLUP-adaptation, mostly creating a special construction zone containing project-specific zoning requirements. For them, a "regular" construction permit (Art. 22 para. 1 lit. a RPG, Art. 25 para. 2 RPG) is necessary. The construction permit is the latest phase in the procedure, and its requirements are defined on the cantonal level (for projects in special construction zones). In these standard cases, the construction permit functions as an "umbrella", also containing all "side" permits necessary to operate the turbine. It may also contain conditional stipulations ("Bauauflagen") for construction, operation, compensation measures and for dismantling and renaturation at the end of a turbine's life cycle. Empirically, with only ten regularly permitted WE-projects having received the construction permit, the picture on conditional stipulations remains somewhat provisional. The present study has collected conditional stipulations data for nine of them: Construction permits contain on average 2.2 subject areas (1.13 SD) with conditional stipulations. These subject areas are narrowly defined as topics of turbine impact, e.g. "noise", "water", "forest", "flora and fauna" etc.

Cantons have demonstrated large diversity in terms of whom they accord the power to grant the construction permits for WE-projects (Zumoberhaus 2018). In many cases, the cantonal department or cantonal executive are competent if it concerns projects that did not undergo a LLUP-adaptation, via the use of an exceptional construction permit, and the municipal executive for projects that did (ibid., 7), which represents the predominant, regular case. Section 5.2.3. gives the details.

Once the final decision is taken, the regular construction permit is handed out by the municipality, the region or the cantonal authority in the form of a written decree of first instance. By law, the decision can either be positive, conferring the right to construct, or negative, refusing the right to build an edifice. In line with the guarantee of private property (Art. 26 BV) and protection of fundamental rights (Art. 36 BV) in the federal constitution, owners of land, in principle, are entitled to constructing an edifice on their territory if the construction project conforms to the law. Territory in leasehold ("im Baurecht") contains additional restrictive conditions governed by rules on easements ("Dienstbarkeiten"). Such a setting is frequently found in WE-projects. If a WE-project is found to be not in conformity with legal requirements, then a decree denying the right to construct could theoretically be handed out. However, empirically, none of the projects in the population defined hereafter have received such a formal construction denial ("Bauverweigerung") in the first instance. Instead, what is customary has been the informal encouragement to rework the application dossier before handing it in or permitting it positively, under formulated conditions.

Balancing federal environmental interests

To grant or deny any kind of required permit, a project must be assessed with regard to the criteria that the permit requires to be fulfilled. As commonly referred to, a project must demonstrate its "capacity to be authorized" ("Bewilligungsfähigkeit"). For the construction permit, its potential use (value, merit, worth) must outweigh its potential compromise of federal interests. By extension, this is also valid for the cantonal and the municipal level. As part of federal-level project compliance in the natural and built (heritage) environment, the following impacts of a wind turbine must be taken into account (ARE 2020b):

1. Noise emissions on the nearest inhabitants (Art. 7 and annex 6 LSV);
2. The "character" of the local landscape (Art. 3 NHG);
3. Forests (Art. 5ff. WaG);
4. Local fauna, mostly birds and bats (Art 1, 7 and 11 JSG, Art. 14 and 20 NHV);
5. Federal protection inventories regarding landscape and natural monuments (Art. ff. NHG, VBLN);
6. Built heritage sites and historic transport routes (Art. 5ff. NHG, VISOS, VIVS);
7. UNESCO world heritage sites;
8. Protected territories such as water, peatlands, natural parks, biotopes, wildlife corridors, among others (Ramsar-convention, GschG, NHG, JSG, KGSG, WRG, PäV).

Following the federal concept on wind energy (ibid., 11), federal interests should be mainly ("schwergewichtig") balanced on the level of a CSP, in case a CSP is required. Detailed assessments are, however, only possible within an integrated environmental assessment (IEA, chapter 3 USG). The IEA is administratively tied to a LLUP-procedure, but it can also be formally tied to the later-phase construction permit. IEAs are based on already existing detailed plans of projects. An IEA must be conducted if a project's total installed electrical capacity is larger than 5MW (Annex 21.8 UVPV), which tends to be reached by two or more average modern turbines. The threshold could technically be reached by a single high-capacity turbine, but the installation of such a large turbine is not currently being planned. In practice, even if a project is below this threshold and no IEA is formally necessary, developers must still confirm to authorities that their project is in line with the applicable laws. Hence, an "environmental note" may still be required (BAFU 2009). As cantons are in charge of implementing the Federal Act on the Protection of the Environment (USG), it is the cantons that lead and guide the developer's efforts in procuring the necessary studies that outline the necessary actions to comply with the federal law. These studies, put together in an IEA-report, must assess all points raised by the environmental requirements catalog. For WE-projects, it is up to the cantons to decide whom to allocate which responsibilities for the conduct, coordination and evaluation of the developer's environmental assessments (Art. 5 para. 2 and Annex 21.8 UVPV). In principle they are free to choose a multiple-stage IEA-procedure with multiple IEA-reports as intermediary results, if they deem it necessary to assess impacts in a stepwise manner by increasing degree of detail (ibid., 9f.). There has been an ongoing discussion on whether the federal state should provide the legal basis for a "strategic" IEA that would allow cantons to assess their CSPs for environmental impacts already (Sutter et al. 2014).

Based on the IEA or an environmental note in case of single or low-capacity turbines, cantons also decide to grant environmental "side" permits if needed, based on federal and their own legislation. The first concerns forest clearance permits (Art. 5ff. WaG). This permit is in the realm of cantonal decision-making (Art. 6 para. 1 clause 2 WaG). However, if the area to be cleared exceeds 5'000m^2 or contains territory of two or more cantons, then the BAFU must be invited and make its case (Art. 6 para. 2 lit. a). All areas that require a "temporary change of use of forest land" (Art. 4 WaG) must be considered. This includes areas necessary for construction (access roads, crane and excavator spaces, etc.) as well as for grid access (Klaber 2014, 174). Experiences from Germany show that in total an area of 2'000m^2 to 10'000m^2 is necessary for one large-scale turbine (ibid., 174). Following a court decision from 2005, legal experts regard it as necessary that at least a binding statement by the cantonal authorities must be present the latest in the LLUP-phase, as forest clearance cannot be dealt with in the latest construction permit phase alone (Klaber 2014, 175). Their recommendation, however, is that potential clearances be balanced with other cantonal forest interests already in the preceding CSP-phase (ibid., 175). Empirically, 62% of WE-projects in Switzerland have needed such a permit (based on responses from 52 projects).

The second cantonal environmental “side” permit that may be needed for a project, but has been rarer, is a water protection permit in case the WE-project would be sited in a protected zone (Art. 19 para. 2 GschG; Abegg and Dörig 2019, 42). Of 49 reporting projects, 49% have reported needing such a permit. Given how sidelined the issue is in discussions on WE-projects, this is a very high number. The author’s interpretation is that this is likely strong overreporting: Developers might confuse the actual permit with the necessary studies on a project’s impact on waterways for the IEA.

Balancing federal infrastructure interests

Next to environmental interests, the federal state also acts to defend its infrastructural interests against being compromised by WE-projects. These are mainly the following:

1. The proximity to federal grid planning corridors (e.g. SÜL, FFF);
2. Civil air traffic obstacles and/or radar impact (Art. 41 para. 1 LFG);
3. Military aviation and military equipment (MG, Art. 9 Anlagenschutzverordnung, Art. 66 VIL);
4. Meteorological instruments (WMO-GL, Art. 1 MetG);
5. Radio relay corridors (FMG).

Wind turbines may have impacts on the federal planning corridors regarding heavy current power lines (SüL) or agricultural lands (FFF). These locational criteria must be dealt with on the level of the CSPs that scout for (positive) or exclude (negative) possible locations for WE-turbines. Wind turbines — just like skyscrapers — can impede the paths for airplanes —, but given their height and rotation they can also reflect and obstruct communication for airplane location tracking (radar) and guidance (instrument landing systems). Skyguide, the Swiss civil air traffic control, must thus show its accordance with the potential wind-turbine area on the CSP-level. The same is valid for the military aviation authority (interview 14). Additionally, once a project finds itself in the LLUP-phase, developers must submit their plans to a "technical preliminary examination" ("technische Vorprüfung"), where these authorities assess in detail whether and how their infrastructure and communication lines are affected. Additionally, there is a concrete additional "side" permit that must be applied for by developers in case a wind turbine is higher than 60m (Art. 63 lit. a VIL). The Federal Office for Civil Aviation (BAZL) may limit the duration of validity of the aerial obstacle permit. Wind turbines require air traffic security illumination (Art. 65b and annex 2 VIL), and this needs to be planned for the turbine to be able to receive a permit. The BAZL decides about the permit in cooperation with the Federal Department of Defense, Civil Protection and Sport (VBS), which brings in the military aspects of air traffic, radar systems or other confidential system's obstruction (Art. 65 para. 1 VIL).

Additionally, if a single or combined turbine installation reaches projected apparent power (incl. that of power lines for grid access) of high-tension installations (>1'000V AC; see Art. 3 para. 8 SwSv and Art. 3 para. 13 StSv ordinance), a planning permit procedure certifying the installation's electrical safety ("Plangenehmigung") is needed (see section III lit. b EleG and VPeA). The Federal Inspectorate for Heavy Current Installations (ESTI) is responsible for this permitting procedure. An association has been mandated to implement these permitting tasks. In terms of necessity of such a permit, >1'000V AC is likely to be any installation above household grid level 7 (240V–1kV). Regarding size, a roof-attached or human-sized garden rotor is likely below this threshold, but any larger-than-garden installation reaches this threshold easily. In Switzerland, most wind turbines are connected to grid level 5 (36kV–1kV); only the largest wind park on the Mont Crosin is attached to grid level 3 (150kv–36kV; Eymann et al. 2015, 54). Hence, for the commercially "interesting" larger-than-garden installations, all are subject to such an electrical safety planning permit. The permit has a limited duration of validity of three years (Art. 16i para. 1 EleG). Empirically, 100% of surveyed projects have needed such a permit.

A typology of wind energy projects

The regulations in this subsection mentioned so far determine procedural design as determined by federal law and implemented by the cantons, except for the aerial obstacle and electrical safety permits that are fully implemented on the federal level. Two have a mixed process: The CSP is approved by the ARE but elaborated on cantonally, either by the cantonal legislature or executive. The forest clearance permit is granted by cantonal authorities, but if a clearance of more than 5’000m^2 is requested, the BAFU must be heard. Building in water protection zones (Art. 19 Abs. 2 GschG) is equally a cantonal permission affair. The LLUP, construction permit and IEA are (at least on paper) autonomous cantonal decisions. However, all permits that the canton hands out are strongly shaped, if not fully determined, by federal legislation.

Combining all possibilities above or below the named thresholds would result in many combinations of federally prescribed procedural set-ups for wind turbines. If each threshold is combined with each other threshold, many theoretical combinations are the result, many of which are either legally non-sensical or practically non-exploitable. Table 5.1 shows the realistic types for WE-projects in Switzerland. The typology has been discussed with the “guichet unique”, the central coordination office for WE-related questions of the BFE, regarding what is realistic in terms of project-type in Switzerland.[122] The “standard” project is one that has been commercially planned and features at least three turbines higher than ca. 120m, with an installed capacity of more than 5MW in total. This would require all permits and planning instruments listed in table 5.1 if, additionally, it requires a forest clearance and a water protection permit. The low-capacity type is one that is similar to the standard described except it has a low capacity, below 5MW. This is predominantly the case for older projects, where the technology was not as developed as today but where the 5MW-threshold had not been legally adopted either.[123] Or it might refer to single but normal-sized turbines. The “small exceptional” type is one where a single turbine could be argued to pertain to the specific site (“standortgebunden”) but the project would clearly be limited in size and impact, not needing fixing in the CSP and an adaptation of a LLUP. There is also the possibility that a small turbine could be permitted using a LLUP and a regular construction permit process. This would refer to a small turbine with limited environmental and human impact. Very small turbines, attached to roofs and standing in gardens, are not

122 Source: E-Mail exchange 12.2018–1.2019.
123 The first wind park in Switzerland on the Mont Crosin was permitted using Art. 24 RGB and retroactively included in the CSP and cantonal regional structure plan of the canton of BE.

covered, because these can be permit-free, depending on the canton. In such latter cases, the criterion for permit-free construction is how “well” these machines integrate visually into the existing buildings.

In this research project, the population of cases included in the data is reduced to only including to the first two types (“standard” and “low capacity”), excluding the other two. This is reasonable given the very small social relevance and explanatory force in view of fulfilling the ES 2050 of the remaining and excluded two.

Legal objections, complaints, cascades of instances

In the standard and low-capacity project types, there are a handful of opportunities to file objections (“Einsprache”) and legal complaints (“Beschwerde”). First, there is the possibility, open to municipalities only, to file for a violation of their autonomy in case the area that the canton foresees as a WE-perimeter in its CSP is based on an inadequate material assessment (“mangelhafte Sachabklärung”; see Klaber 2014, 198; Abegg and Dörig 2019, 20). In principle, cantons are free to not hear such a case, in which the CSP may be judicially questioned by a municipality either directly after the CSP has been federally approved (see BGE 1C_11/2020) or in so-called accessory control (“akzessorische Normenkontrolle”) together with charges against a later LLUP. However, federal courts must hear such cases (Klaber 2014, 199).

A second opportunity to resort to legal means arises during the public deposition of all relevant LLUP-documentation. Legal objections may be filed by concerned landowners and those people with a “legitimate interest” (“schutzwürdiges Interesse”) in the publicly deposited change (Abegg and Dörig 2019, 32). This includes nature protection organizations, provided that they have been active on the national level and for at least ten years (Art. 12 para. 1 lit. b NHG and Art. 55 USG). Limiting these organizations is that they may only file objections and later complaints if the project under consideration is subject to an IEA (ibid., 34). “Legitimate interest” is defined very differently across cantons: Whereas in some all citizens are competent to file objections (e.g. AI, GE), most cantons restrict the circle to neighbors and to those with immissions (e.g. FR, TI). The public deposition may be held before or after public authorities, such as the municipal legislature or assembly, have decided on the LLUP (Klaber 2014, 203). In the more common case that will be followed, public deposition takes place before the decision to grant it is made: In a common case, after having received

Table 5.1: Realistic WE-project types.

Permit	Threshold	Standard	Low Capacity	Small Exceptional	Small
CSP	>30m total height?	Yes	Yes	No	No
LLUP	–	Yes	Yes	No	Yes
Construction permit	–	Yes	Yes	Exceptional	Yes
Exceptional permit (Art. 24 RPG)	Pertain to specific site?	N.A.	N.A.	Yes	No
IEA	>5MW inst. capacity?	Yes	No	No	No
Electrical safety	>1’000V AC grid connection?	Yes	Yes	Likely	Likely
Aerial obstruction	>60m total height? And/or within exclusive zone?	Yes	Yes	Unlikely	Unlikely
Forest clearance	>5’000m^2 total area?	Likely	Likely	Unlikely	Unlikely
Water protection	In protected zone?	Possible	Possible	Unlikely	Unlikely

and negotiated between developers and those who objected during public deposition, a municipality takes the decision, which is then validated by the cantonally competent agency. If no compromise can be reached, then those that have objected (and only those) can file legal complaints (Klaber 2014, 203f.). Depending on the cantonal-internal rules on LLUP-instruments (framework LLUP followed by special LLUP, or just one of them), up to two separate legal cascades can stem from the LLUP-phase.

By law (Art. 33 para. 2 RPG), cantons must treat LLUP-cases at least in one instance, but most cantons foresee two (ibid., 207). The first being an authority of cantonal administration and the second is the upper cantonal court (ibid.). If complaints are refuted cantonally and the plaintiffs are recognized by federal law as "legitimate" (Art. 89 para. 1 BGG), then the federal courts will hear the case. In the policy area of spatial planning and under the condition that the upper cantonal courts have treated the case, then the Federal Court itself will hear the case under exclusion of the Federal Administrative Court, which would be its previous instance competent in the domain of public law matters (ibid., 212 and fn. 1072). The Federal Court then decides conclusively. It may also refer the case back to a previous authority ("Kassation").

The possibility for a third cascade of instances is then given after a construction permit has been granted or denied (ibid.). Cantonal law governs how this permit is granted (Abegg and Dörig 2019). Following the coordination clause of Art. 25 para. 2 lit. b RPG, the full documentation for all necessary permits on a federal (electrical safety, aerial obstruction) and cantonal level (construction, forest clearance, water protection, cultural and built heritage protection) should be publicly deposited at the same time. Moreover, the resulting decrees are to be granted as simultaneously as possible ("möglichst gleichzeitig") and cannot contain material contradictions (Art. 25 para. 2 lit. d RPG; see ibid., 45). The idea behind such coordination is that it should be possible to challenge multiple dispositions in the set of decrees simultaneously using a single legal instrument (BGE 116 IB 50, consideratum 4b).

Yet the problem is that not the same authorities/courts are competent to hear legal complaints in first instance when dispositions in federal and in cantonal decrees are challenged. A cantonal court is not competent to interpret a decree of the federal level. On this matter, the Federal Court has maintained that in such cases the participation of federal judges in cantonal-level court cases could be permissible (BGE 116 IB 50, consideratum 4b). At the same time, however, the Federal Court ruled in 2017 that "[...] the obligation of coordination is not necessarily violated if two decrees that must be coordinated can only be granted in succession of each other, thereby making it impossible to be challenged simultaneously and with a single legal instrument, if there is no danger of material contradiction" (BGE 1C_617/2017). But this means that it is possible that there is a separate cascade of instances after the aerial obstacle permit, the electrical safety permit, the construction permit and after other specialized cantonal permits. Thus, in addition to a third possible legal cascade contesting dispositions of the construction permit, many more legal cascades are theoretically possible, depending on the number of specialized permits. Maximally, if all named special permits are required and no co-ordination is conducted, then four cascades are possible, in addition to the third disputing provisions of the construction permit. However, even if they are handed out sequentially and judicially attacked sequentially, the judicial procedures can then be put together again when the various challenged dispositions regarding the same WE-project are heard at the same court in later-stage courts. Hence, if such judicial coordination is possible, it could also be disputed whether all additional legal cascades of instances due to non-coordination can each be counted as a single cascade, because they will likely not be fully self-standing.

Regarding the federal decrees of electrical safety and aerial obstruction, the Federal Administrative Court is competent in first instance (Art. 47 para. 1 lit. b VwVG in connection with Art. 31ff. VGG). In second instance, the Federal Court decides conclusively.[124]

124 For the electrical safety permit, there are both regular and simplified procedures. In the regular procedure, the necessary documentation is publicly deposited together with the construction permit documentation (Art. 16d EleG). In the simplified procedure, only the parties concerned must be notified in written with individualized deadlines for objections (Art. 17 para. 3 EleG). However, in both procedures the ESTI may conduct negotiations when it receives objections. If the negotiations seem forlorn in the first place, it may refuse to do so and transfer the dossier to the BFE. The BFE is then in charge to lead negotiations and seek compromise. If no compromise can be reached, it then takes a decision. Only those natural and judicial persons that have filed objections may then file complaints at the federal courts (Art. 16f. para. 1 EleG). The aerial obstacle permit follows the complaints procedure of the "general provisions on the administration of federal justice" (Art. 6 para. 1 LFG). If a wind turbine affects an air traffic safety zone, then its impact must be considered in the safety land-use plan ("Sicherheitszonenplan"), which is adapted in an additional LLUP-procedure (Art. 71ff. LFG). This could generate another possible legal cascade if it is not passed simultaneously to the main LLUP-procedure for the wind turbine. Moreover, since this would be materially attached to a federal permit, it would present another challenge of coordination between decrees. But since this is a special case, the requirement of the aerial traffic safety LLUP-adaptation will

What is commonly the case is that the full project dossier must be submitted to the municipality that preliminarily examines it and then organizes a public deposition. This must be announced in the municipality's official publications. In some cantons, landowners (and neighbors) must be additionally notified of the public deposition (Klaber 2014). With the beginning of the public deposition, developers must display a real-sized profile of the planned construction ("Bauprofil") normally using wooden latches. Because this is very complicated for these large turbines, cantons allow for other visualization possibilities (e.g. using LASER). As for the objections regarding the LLUP, legitimated nature protection organizations may also file them. After seeking compromise between those that put forth objections, the competent authority (which is commonly the municipality) comes to a decision. Against such a decision, legal complaints may be filed. The cascade of instances for construction permits follows the same federal law provisions of at least one cantonal instance; if this is not the Cantonal Upper Court, the Federal Administrative Court will hear the case (if the plaintiffs are federally legitimated). In last instance, the Federal Court decides conclusively.

In summary, the minimal number of potential legal cascades is one, in case of complete coordination, concentrated procedures and the lack of recognition of cantonal courts for municipal autonomy complaints, although the federal courts would be able to hear such a case. The maximal number, in contrast, is seven, in case there is no coordination and a project faces the maximal requirement of specialized permits.[125] What needs to be considered, however, is that such a count also depends on whether cascades that are started at different courts but are put back together for the treatment of later-stage courts are counted as separate cascades. Crucially, it further needs to be considered that the possible legal cascades multiply if there are multiple cases (by different plaintiffs) that use the same instrument at the same time, which a court cannot — for one reason or another — consider together. A further potential multiplier of legal cascades is when a single project is located in multiple cantons. In such a case, if left uncoordinated, the potential number of legal cascades could again double. It is again very likely, however, that cantons would not leave such a case uncoordinated. Empirically, of 40 single-canton projects on which there is data, and assuming perfect coordination

be disregarded. I thank F. Klaber to explain some of these proceedings regarding possible cascades of legal instances. Source: e-mail exchange 07.2022–08.2022, 04.2023–05.2023.

125 The number amounts to eight in case of uncoordinated aerial traffic safety LLUP with the main LLUP.

for those that have not yet experienced non-coordination, twelve projects (30%) had or will have a single (potential) legal cascade, 28 (70%) will have two. Municipal autonomy complaints are excluded from this numbering, as they were asked about separately: One project potentially having two legal cascades also additionally experienced a legal autonomy complaint by a municipality concerning the CSP. One bicantonal project had three complaint-openings for legal cascades (two in one canton, one in the other), excluding municipal autonomy complaints. The other bicantonal project had two, one in each canton (concentrated procedure in both cantons).

The regular procedure of standard and low-capacity projects

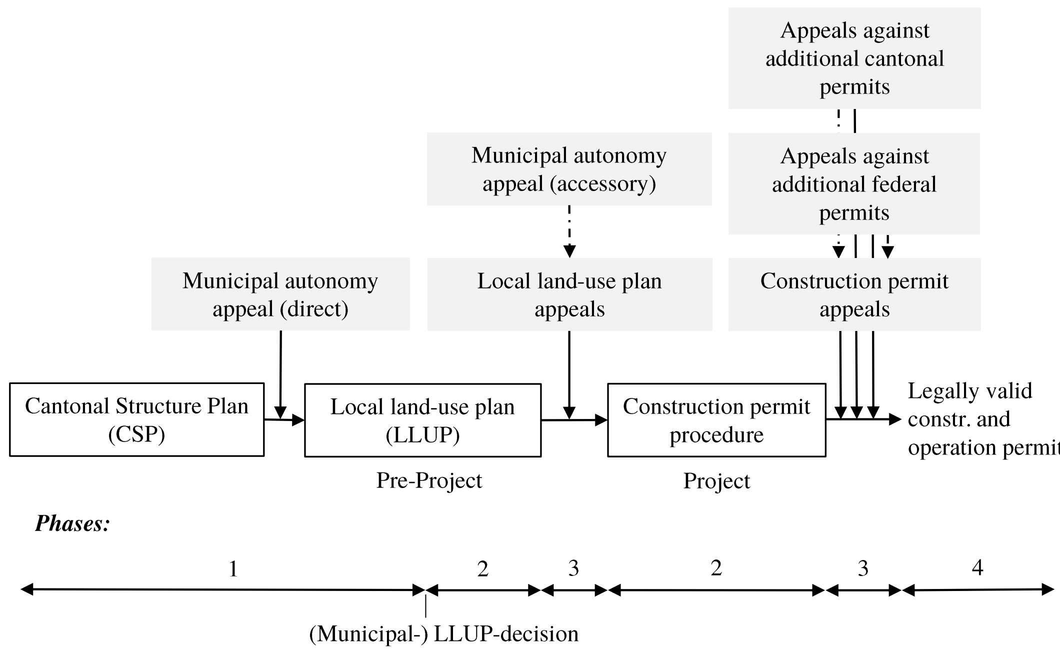
Figure 5.2 gives an overview over these 3–7 different possible cascades of instances for legal complaints. Moreover, the figure also shows the planning and authorization instruments based on spatial planning dispositions from federal legislation needed to authorize "standard" and "low capacity" WE-projects in Switzerland. It further depicts how this research project separates the procedure into four "phases" or parts that are distinguished to control for project advancement later on: This might seem illogical at first glance, as the phases do not strictly follow the logic of the procedural instruments: Rather, the logic of the phases stems from a developer's perspective. First, there is the "general planning" phase. Empirically, the CSP is only fixed in 54% of cases *before* developers start with the LLUP. In the 46% remaining percent of cases, the location has not been fixed in the CSP and approved by the ARE.[126] The beginning of the LLUP is thus not a suitable point to demarcate the first from the second phase.

Better suitable is the time of the LLUP-decision, which, mostly taken by a municipal assembly, may also be taken by the municipal executive, the cantonal administration or the canton's inhabitants. With the decision taken, the second phase, which is called "detailed planning", starts. What complicates matters is that some cantons "concentrate" the LLUP and construction permit instruments, meaning to combine them into a single planning decree with the assessments for both phases running in parallel.[127] Because this is

126 There are even cases in which the LLUP was handed in for cantonal pre-approval before the CSP has been federally approved.

127 Not to be confused with the principle of concentration that refers to the need to plan for multiple turbines for a single location for reasons of maximizing electricity gains and minimizing their environmental impact.

Figure 5.2: Overview over federal law proceedings and over phases, as used in this research project.



Notes: Legal instruments are shaded in gray, planning and permitting instruments are framed, phases are indicated by arrows whose length corresponds to the procedural elements they include.

empirically the case of a large number of host cantons, the construction permit procedure is included in the detailed planning phase. LLUP-appeals, an associated accessory municipal autonomy complaint, a construction permit appeal as well as cantonal specialized and federal specialized permit appeals are combined into a third "appeals" phase. Even when cantons do not foresee a concentrated procedure, developers need to combine fulfilling the requirements for the LLUP and the construction permit instrument anyway, as the IEA requires pre-project-, but also project-level action by developers (see Aemisegger and Marti 2021, 12ff.). The two phases — after the municipal decision — are thus combined with regard to chronological simultaneity. The fourth and latest phase is then accorded to those projects having received a final, legally valid positive construction permit. It is also accorded to those projects that have advanced to being operational as of the cut-off date of 31.12.2021.

5.2.3. Cantonal differences in policy implementation

As hinted at already, despite encompassing legal provisions on the federal level, there are still substantively meaningful differences in the design of the authorization procedures between the cantons in a regular procedure (for standard and low-capacity types of WE-projects). This section aims at presenting them. The empirical illustrations I draw upon for selected topics of cantonal differentiation stem from the PCS.[128]

To start with, there are cantons in which the CSP is decided upon by the cantonal executive and others and in which the plan is enacted by the cantonal parliaments — before being sent to the federal authorities (ARE on behalf of Federal Council) for validation. In four cantons (AR, FR, GL and VD), the procedure is two-stage, incorporating both cantonal political institutions. In eight cantons (AG, BL, GE, JU, NW, TG, VS, ZH), solely the cantonal parliaments enact it. In 14 cantons (AI, BE, BS, GR, LU, NE, OW, SG, SH, SO, SZ, TI, UR, ZG), enacting the CSP is at the single-handed discretion of the cantonal executive. What difference does it make if one or the other cantonal institution enacts the CSP? Executives tend to decide in consociational fashion and are most often full-time heads of the administration (Vatter 2020, 210ff.), whereas cantonal parliamentarians tend to

128 With the exception on data on CSP-enactment, which is secondary data from the ARE.

be lay politicians (Feh Widmer 2015). But in both cases the administration is likely to draft the plan regardless of who will adopt it. Moreover, the relative power of both cantonal institutions varies strongly across cantons: Some cantonal parliaments are much more powerful (e.g. BE, BL, GE) than others (e.g. AR, BS, SH) vis-à-vis the executive (Wirz 2018). Still, it is regarded as possible that there are structural effects of one or the other adoption mechanism: It is hypothesized that partisan preferences are more strongly detectable in parliamentary-enacted CSPss than in those enacted by the cantonal executive, especially if the parliament is very powerful compared to the executive (e.g. GE). Moreover, parliaments are not subjected to consociational decision-making, as is still practiced in most cantonal executives (Bochsler and Bousbah 2015). Empirically, the picture looks as follows: In eleven of the 17 WE-hosting cantons (65%), the executive is either partially or fully in charge of enacting the CSP. In the remaining nine non-WE-hosting cantons, the executive is in charge only in 44%. At first glance, if there is a connection, this would mean that cantonal executives tend to be more WE-friendly than parliaments.

Another cantonal difference is whether cantons foresee the fixing of the potential site into a structure plan of an intermediate territorial level between canton and municipality, the region. This planning instrument tends to precede the fixing of a territory in a CSP, but it can also follow thereafter. Five cantons (AR, BE, GL, GR, LU, SZ, TG, ZH) know such regional planning instruments, but this leaves the question open whether it is necessary for WE-project authorizations. Those that the study has been able to certify with regional structure planning for standard WE-projects are the cantons of BE, GR and LU. Empirically, based on the full project-population of 85 cases, 34% of WE-projects required prior regional structure plan fixation. An intermediate planning instrument might add additional planning time to the procedure (and thus delay it), but it might also help to reduce the CSP planning time used to elaborate both structure plans individually, making a theoretical judgement on duration impossible.

Moreover, LLUP-design is also strongly canton-dependent. For a standard type of WE-project, some cantons require the enactment of a framework land-use plan ("Rahmennutzungsplan" / "plan d'affectation général") ensued by a special land-use plan ("Sondernutzungsplan", also known as "Überbauungsordnung" / "plan d'affectation spécial", "plan de quartier" etc.). This is the case for the previous projects of the cantons of SG and VS. Projects in the cantons of AI, BE, BL, GR, JU, LU, VD have so far required only a framework land-use plan. In most cantons, both are possible, and many cantons (AG, AR, BS, FR, GE, GL, NW, OW, SH, SO, SZ, TG, UR, ZG, ZH) do not specify the procedure in their dedicated CSP-documentation (Zumoberhaus 2018).

Aside from the form, sequence and label of LLUPs, there are four additional LLUP differentiation criteria proving an enormous procedural diversity in their enactment and validation: First, there are differences between the branches of government (legislature vs. executive) that act as primary enactors of LLUPs. In FR and SO, it is the executives that enact LLUPs, in all other cantons it is the legislature (Jeanneret and Moor 2016). Second, cantons are also different with regard to the level of government that enacts them. Taking the standard-size WE-project as the guiding illustration, NE and TI enact the necessary LLUPs on the cantonal level. In LU, there is the possibility for regional land-use plans. In all other cantons, enacting the required LLUP is a municipal task (Zumoberhaus 2018; Jeanneret and Moor 2016). Third, different branches of government validate the decision (after enactment/adoption). In all cantons except for GE and OW (if on cantonal level), this is done by the executives (cantonal/municipal executives or departments) if validation is even required (Zumoberhaus 2018). Fourth and last, cantons also show differences with regard to the level of government that validates the LLUPs. For standard-type projects, in the cantons of AI, AR, BE, BS, FR, GE, GL, NE, SG, SH, SO, TG, TI, UR, VS, ZG, ZH it is the canton (its executive or the relevant departments) that validates the decision. In BL, GR, NW, SZ, VD it is the municipal level. In JU, LU, OW both levels validate depending on the issue-level (ibid.). This leads to a total of 60[129] LLUP design possibilities. Thus, theoretically there are 34 more logical possibilities of LLUP procedure design than there are cantons. This does not mean that all cantons are unique cases, but it just shows that there are strictly no possibilities to typologize cantonal LLUP procedural design for further treatment because such an effort could not be parsimonious and still reflect empirics adequately. Still, LLUP-modalities might be important factors for PSE.

Not only is there great diversity in planning requirements across cantons regarding LLUP-instruments, there is also the fact that all of the five criteria have changed and continue to change across time. Hence, the study simplified matters and asked developers only about the form of the necessary LLUP-

129 Form: 3; Enactment-branch: 2; Enactment-level: 2, Validation-branch: 2, Validation-level: 2; Possibilities: $3 * 2^4 = 48$ if validation is needed and $3 * 2^2 = 12$ if formal validation is not needed. This leads to a total of 60 combination possibilities.

instruments for the projects under consideration. The cantons that were asked about the local land-use instrument responded for 39 WE-projects in total. Of those, twelve (31%) were or will be permitted using a framework land-use plan. 15 (38%) were or will be permitted using a special land-use plan. One project (3%) underwent both a framework and a special land-use plan. One will be based on a cantonal land-use plan (3%). The remaining projects underwent or will undergo some kind of concentrated procedure, as elaborated on further below.

The procedural design regarding the elaboration and granting of construction permit is also very diverse across cantons. In the standard case, a WE-project is planned in specially dedicated construction zones ("Spezialbauzonen"), for which cantons are in charge to organize the procedure. In the 18 cantons of AG, AR, BE, GR, JU, NE, NW, OW, SG, SH, SO, SZ, TG, TI, VD, VS, ZG and ZH, the municipalities are competent to approve or deny the construction permit application (ibid.). In the cantons of AI, BL, BS, FR, GE, GL, LU and UR, it is the cantonal authorities that decide, either the construction departments or the cantonal executive (ibid.). In canton of AI, either the canton or a region is competent in handing out the construction permit for such projects. Almost all cantonal construction laws know some form of "coordination clause" that externalizes charges in case of complicated projects: In BE, e.g., it is only the larger municipalities (>10'000 inhabitants) that are competent to hand out construction permits involving much coordination. For coordination-heavy construction applications on the territory of smaller communities in BE, the head of the regional level ("Regierungsstatthalter") is competent (Art. 33 BauG-BE). In the canton of AG, e.g., for applications involving much coordination, the cantonal authorities must give their approval prior to municipalities making a decision (Art. 63 BauG-AG). Construction permit decisions do not tend to need an ex-post validation like for the LLUPs. Rather, prior cantonal approval, as in the case of municipalities in the canton of AG, is often sought.

Another procedural determination at cantonal discretion is the allotment of the "lead procedure" ("massgebendes Verfahren"). Following the federal rules on the IEA, the lead procedure is "to be determined by cantonal law" (Annex 21.8 UVPV). Art. 5 para. 3 UVPV allows cantons to choose between the LLUP and the construction permit phase as a formal attachment. At what point in the entire authorization process the IEA must be finished and handed in is a crucial planning aspect to developers: The IEA-reports regularly are hundreds of pages long, detailing all aspects of environmental compliance and compensation.[130] For developers, when this effort must be provided is a crucial financial and time commitment. In the cantons of BE, BS, FR, GE, GL, GR, TG, UR, VS, ZG, the lead procedure is the construction permit (Zumoberhaus 2018). In the cantons of LU, SG and ZH, the lead procedure is the framework or special land-use plan (ibid.). In the cantons of AG, AI, AR, BL, NE, OW, SH, SZ, VD, the matter has not been regulated (ibid.). The cantons of SO and TI foresee a two-stage IEA procedure, where the lead procedure is the LLUP in the first stage and the construction permit in the second (ibid.). In the canton of NW, the pertinent stage is the electrical safety planning permit that is dealt with in parallel to the construction permit (ibid.). As the enactment of the ESTI permit is the federal level and for the IEA it is the cantons, this tying is questionable in terms of judicial procedure that could follow.

Cantons may further decide whether they run the LLUP and the construction permit process in parallel or sequentially. The so-called concentrated procedure (e.g. in BE, VD)[131] results in the simultaneous granting of two permits as one (“Nutzungsplanung als Baubewilligung”). These cantons thus attempt to reduce the number of possible cascades of judicial case treatment because this also entails the combination of LLUP- and construction-permit appeals into one appeals cascade of instance. This holds the promise of greater efficiency.[132] As with the LLUP-design, the practice of concentrating instruments has evolved and changed over time. Empirically, in a total of 39 projects for which there are data, ten projects (26%) underwent or will be undergoing a concentrated procedure in at least one canton. Eight of these

130 Which environmental aspects must be clarified already on the CSP-level is disputed. In the interviews, cantons have claimed that the offloading of detailed planning tasks to the public, which should be a later-phase developer’s task, has been difficult to manage (interviews 13 and 18). At the same time, developers have detected and lament a strong increase of needed assessments (especially interview 1).

131 The concentrated procedure is not to be confused with the “combined” procedure. The combined procedure refers to an authorization procedure that simultaneously includes an expropriation procedure. For other policies, such as the construction of roads, many cantons foresee such a combined procedure already; see Aemisegger and Marti 2021.

132 There are too few cases in which such a procedure has been applied, yet the experienced federal judge Mr. Aemisegger and the lawyer Mr. Marti (ibid.) strongly recommend it. In contrast, an empirical study by Econcept (2015) advises caution, having found no time advantages in such a concentration.

projects are single-canton hosted, two are hosted in two cantons.[133] In the remaining 29 projects (74%), the two phases were not conflated to run in parallel: Twelve projects (31%) underwent or will undergo a framework land-use process before being subjected to a construction permit process. 15 projects (38%) need(ed) a special land-use plan, followed by a construction permit. A single project (3%) needed both forms of LLUPs, again followed by a construction permit process. One (3%) requires a cantonal land-use plan followed by a cantonal construction permit procedure.[134] The mean number of after-CSP processes for project-cantons, ranging from 1–3 until the final construction permit, is at 1.71 (0.51 SD) in the sample.

Materially, cantonal divergences also arise from flows of canton-internal coordination. Having a lead agency and a defined internal circulation of dossiers is critical for effective and efficient coordination (Knoepfel 2018; Knoepfel et al. 1995). Two aspects are crucial: First, deadlines for issue assessment ("Ordnungsfristen") can be set for certain parts of procedures and not for others. Moreover, the circulation of dossiers can happen sequentially in a cantonal administration or in parallel, requiring a leading agency ("Leitbehörde"). Empirically, of the 41 respondent projects for which there are data, 100% of the cantons have formulated rules for dossier circulation. In two-thirds of these projects, cantons indicate that a fully parallel dossier circulation procedure has taken place or will be conducted. In 74% of the 41 respondent projects, cantons indicate that they had set deadlines. In an index that combines the strictness of time-deadlines with whether there are fully/mainly parallel procedures on a range from 0 (less strict) to 2 points (stricter),[135] the 41 projects have reached a mean of 1.1 (0.8 SD). Because assessment delays may also occur due to changes in laws affecting the authorization procedure, all project host cantons were asked for each WE-project whether a substantive change in procedure resulted in dossier assessment delays: In a total of 40 projects, the cantons reported delays due to changes in the law in nine of them (22.5%). They were further asked for each project whether the duration and quality of assessment for their WE-procedures had been affected by administrative reorganizations. All project host cantons

133 Of the latter kind, there is a concentrated procedure in both cantons for one project, and in the other only one canton pursues the concentrated procedure.

134 The total percentages of concentrated and sequential-process projects are >100% because two projects are bi-cantonal.

135 Shorter than three months = 1 point, longer or no duration deadlines = 0 points; mainly parallel = 0 points, fully parallel = 1 point, index consists of added points.

indicated that the assessment of these projects was only a single task among many and had not been affected by reorganizations (0%).

5.3. An overview of existing large-scale Swiss wind energy projects

Now that a typology of WE-projects has been set-up and the authorization procedure has been laid out, the present section is dedicated to statistically summarizing WE-projects to adumbrate previously inexisting systematic knowledge about the state of WE in Switzerland. Data on the authorization procedure of each WE-project has been captured using the PCS. The survey accounts for municipal, regional and cantonal policy rules and changes in these rules across time. The present section first and foremost gives an indication over how many projects there are, how advanced they are, which planning processes they went through or are about to, which objections they faced, how administrations of all government levels treated the project as well as costs and participation details.[136]

General characteristics

Let us begin with some general project identifiers. Table 5.2 presents these overall descriptives. On average, there are 1.55 municipalities involved in a WE-project in Switzerland, ranging from 1 municipal host to a maximum of five (0.98 SD). A bit over half of the involved municipalities are French-speaking, which is disproportionately high.[137] Following the municipal typology of the Federal Office of Statistics (BFS) ranging from a "1" denoting a "urban municipality with a large agglomeration" to a "9", labeled a "rural and peripheral municipality" (BFS 2012), one can see that the mean municipal type hosting a WE-project is a "periurban municipality of low population density". With a SD of over 2-type categories, one can claim that WE-projects are clearly not an urban phenomenon (no city parks, hills in the city, etc.) but at most a peripheral if not entirely rural one. Because electricity

136 To update project knowledge between the response date and the cut-off date of 31.12.2021, obvious developments based on newspaper documentations were manually included. Because most of the time not all data were available for all questions, the number of units to be compared is indicated by "n".

137 In 2020, 22.6% of the residential population in Switzerland spoke mainly French at home (BFS 2022a).

Table 5.2: Descriptive project overview data.

Variable	Min	Max	Mean	SD	N
No. of municipalities per project	1	5	1.55	0.98	121
French-speaking municipalities (BFS 2021a)	0	1	0.51	0.5	121
Municipal type (BFS 2012)	1	9	6.24	2.22	121
French-speaking project	0	1	0.4	0.49	85
No. of projects per canton	0	13	3.27	3.95	85
Project advancement (index)	1	4	1.86	1.16	85
Wind energy harvesting potential (by canton)	1	5	3.41	1.45	85
Developer temporarily stopped project (N/Y)	0	1	0.26	0.44	54
Duration of temporary project stop (in months)	1	102	48.5	26.1	14

is consumed to a much larger extent in the cities, this implies that, ceteris paribus, planners prefer longer transport lines than turbines closer to the city. Of course, this might be borne of necessity of wind being harvestable only in non-densely built areas, but it is also clear that transport losses are thus to be factored in when designing a WE-project.

The cantons are also engaged in WE-projects very differently: The canton of VD hosts 13 projects, while nine cantons are not (yet) involved in hosting projects at all. The average canton plans about 3.3 projects, with BE (twelve), VD (13) and VS (ten) being the clear outliers.[138] Project advancement is measured in four very rough phases as described in figure 5.2. For the advancement indicator, one can see that the average project in Switzerland is still in the general planning phase, approaching the (municipal) day of LLUP-reckoning. It was further checked whether developers initiated projects and then abandoned or interrupted them: Based on data from 54 projects, about a quarter of them experienced some temporary interruptions, ranging from 1 to 102 months (8.5 years). The average interruption decided upon by the developers is 48.5 months or four years (SD 26.1 months).

138 See population definition in section 5.1. applied to standard- and low-capacity types of WE-projects.

Duration

A key overview-characteristic for developers is the duration of authorization procedures of Swiss WE-projects. They vary widely as one can see in table 5.3. Starting point of the duration measure is the date of the met mast authorization. Of the completed projects (discarding those that were scrapped) there are ten projects in the database that took from four months to 260 months to get authorized. The project that only took four months is an extension project very close to an existing wind turbine that needed fixing in the CSP, together with the previously existing turbine and a reform of the LLUP, which is done separately. The met mast was built while the CSP and LLUP were ongoing. This is a relatively old extension project, with no court cases. Because it was an extension, only a minor LLUP-reform needed to be made, which was uncontested. Moreover, the minor LLUP-reform was accepted concurrently with a construction permit. No additional IEA needed to be conducted.[139]

This is by far the record in terms of speed, but such an uncommon project is very unlikely to happen again. The maximum in all projects is one that is still ongoing, with 288 months since met mast authorization (that is 24 full years). It is striking to see that the completed projects had a mean duration of 93.9 months or almost eight years, whereas the ongoing projects have taken almost ten years by the cut-off date already. This is a sign that there are older, contentious projects whose authorization procedures are still ongoing, but also that newer projects are not fast-tracked either. It is also a result that confirms the perception of the topic of WE having grown to be more contentious over the last decade. In numbers, half of the projects have been completed in less than 61 months, but in ongoing projects half of the projects already take over 122 months. WE-projects that have definitely been scrapped have been in planning for 1.58 to 2.42 years, with a mean of 2.14. Calculating costs of two years of planning, these few years already represent a substantial overhead cost of a few hundred thousand CHF for developers.

139 The devil is in the details: I have debated whether to exclude or include this project, but as it fulfills the formal criteria of needing fixing in the CSP and there was a met mast authorization date for this turbine, I have kept it in. Other extension projects, such as the Mont Crosin extension in 2010, as well as repowerings in 2013 and 2016 I have excluded. I have excluded all repowerings in the population, and I have also excluded the extension from the year 2010 because it received federal validation of the CSP ex-post, only in 2012 CSP.

Table 5.3: Average authorization procedure data for project samples. Starting point is the met mast authorization, end points as indicated.

Project sample	**Min**	**Max**	**Median**	**Mean**	**SD**	**N**
All, of which...	4 / 0.33	288 / 24	112 / 9.33	109 / 9.11	57.13 / 4.76	73
Completed projects (only those having received a legally valid construction permit)	4 / 0.33	260 / 21.67	61 / 5.08	93.9 / 7.83	79.98 / 6.67	10
Ongoing projects only	16 / 1.33	288 / 24	122 / 10.16	116.07 / 9.67	49.68 / 4.14	60
Definitely scrapped projects	19 / 1.58	29 / 2.42	29 / 2.42	25.67 / 2.14	4.71 / 0.39	3

Notes: Duration is indicated in months / years. Start date for projects is 01.01.1998. Cut-off date for project start is the 31.12.2018 (met mast authorization), and cut-off date for the duration count is the 31.12.2021.

If one is then to take a look at duration by phase as depicted in table 5.4, what meets the eye first is that the largest part of projects, 59% of them, find themselves in the initial planning phase. That there are only about ten projects in each of the more advanced phases further underlines this clear earliness imbalance. This paints a picture of projects “being stuck” in planning cycles, without significant advancement. Such an argument would be further underlined by the finding above on more than half of the more advanced projects having experienced a duration of over ten years. The minimum duration a project finding itself in the first phase is 1.3 years, the maximum is 14.5 years, with a mean of 8.5 years. In the second phase, after municipal voting, the maximum, median and mean are very similar to the first phase. This shows that moving to the second phase has not taken longer on average, especially if one considers the many planning loops of more recent projects “stuck” in phase 1. I argue that the projects having advanced beyond the first phase are relatively older in terms of their starting point and faced a less contentious political environment and fewer requirements (e.g. compensation measures) at the time of their planning.

After voting and public deposition of the project, court cases add substantial delay, especially compared to those projects having already been authorized. The project with the highest duration of 24 years is in this court phase as of the cut-off date. In comparison, the longest it took for one of the authorized projects to get the permit is 21.7 years. Median and mean of projects in the third court phase are close to each other, meaning that they are likely about regularly distributed, with no clear outliers. Half of the projects are above 159 months in this phase, whereas half of the projects that have already been authorized are below 61 months, which is a decrease of factor 2.6. In other words: Newer projects more often go to court — and court proceedings take their time. How long the court procedure takes, however, varies strongly, with a large standard deviation of over four years. The duration of the court phase is thus relatively unpredictable, and two reasons are suggested for this: First, it is unpredictable what makes plaintiffs pursue or forego appeals. Second, courts need widely different amounts of time for their decision-making, depending on their backlog, the depth of the considerata, etc. In the fourth phase containing projects that have been authorized, the minimum is four months, the maximum is an astounding 260 months.

Table 5.4: Average authorization procedure data by phase.

Indicator	Phase 1	Phase 2	Phase 3	Phase 4
Min	16 / 1.33	36 / 3	84 / 7	4 / 0.33
Max	174 / 14.5	159 / 13.25	288 / 24	260 / 21.67
Median	101 / 8.42	112 / 9.33	159 / 13.25	61 / 5.08
Mean	102.37 / 8.53	102.11 / 8.51	157.42 / 13.12	93.9 / 7.83
SD	49.44 / 4.12	35.02 / 2.91	49.17 / 4.1	79.98 / 6.67
N	43	9	11	10

Notes: Phases as depicted in figure 5.2. Duration is indicated in months / years. Start date for projects is 01.01.1998. Cut-off date for project start is the 31.12.2018, and cut-off date for the duration count is the 31.12.2021.

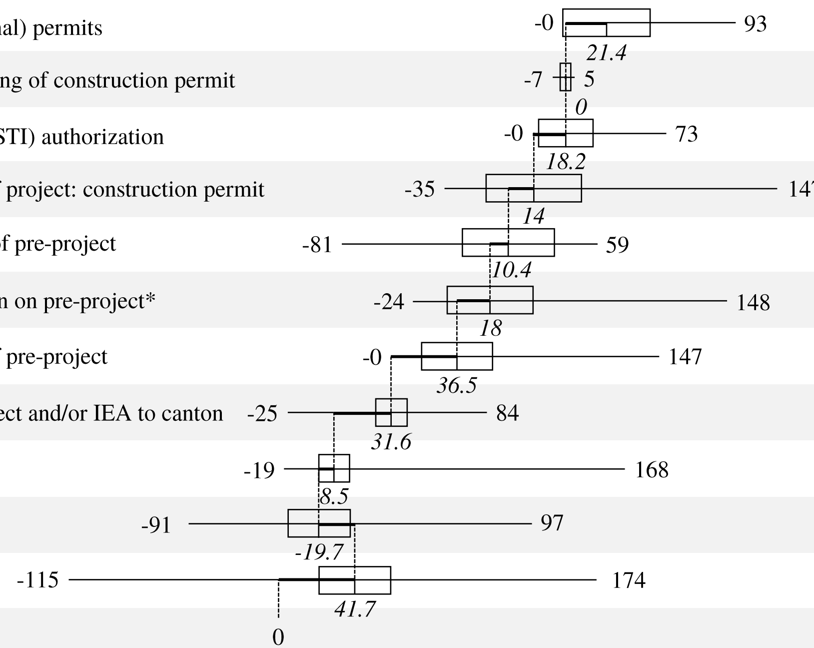
Summarizing all duration information graphically, figure 5.3 depicts duration information by stage. The term "stages" is used to define "subphases".[140] Stages start with the met mast approval at the bottom and end with the reception of the final, legally valid construction permit on top. Many pieces of information are visible by stage: Minimum and maximum values are indicated by the number and length of lines starting from the previous mean (or from zero for the met mast approval). Thick lines and numbers in italics show the average duration in months. Rectangles show the 95% confidence intervals. All lines are drawn to scale. The succession of stages is modeled after the procedure in BE.

What meets the eye first are the enormous ranges. This is a telling fact: There has not been "the" project so far, there is a large diversity in terms of duration, but also in terms of planning and authorization procedures. What this shows is that implementing authorization procedures still seems experimental to the cantons. Of course, the natural environment and the number of involved cantons and municipalities differ widely for each site and project, but it also points to cantons and municipalities according different

140 Phase 1 includes all stages in figure 5.3 from met mast approval to the public deposition of the pre-project. Phase 2 includes all stages from the popular vote(s) on the pre-project to the first instance granting of the construction and operation permit. Phase 3 only contains the last stage of receiving the legally binding construction permit and would also include court treatment starting with the cantonal approval of the pre-project. The fourth phase, construction and operation, is not shown, as it contains those that have passed the entirety of stages.

Figure 5.3: Average duration of planning stages in months.

N	SD	Planning stages
7	32.7	Legally binding (final) permits
6	3.6	First instance granting of construction permit
9	22.9	Electrical safety (ESTI) authorization
11	44.2	Public deposition of project: construction permit
9	38.7	Cantonal approval of pre-project
12	41.6	(Municipal) decision on pre-project*
17	40.8	Public deposition of pre-project
37	26.6	Hand-in of pre-project and/or IEA to canton
44	28.4	Start of IEA
26	44.3	Start of pre-project
32	56.6	CSP fixation
-	-	Met mast approval



Notes: Min (left), max (right), mean (bold line / italics) and confidence intervals (rectangle) are indicated. * Mostly containing municipal assembly votes, but the cantonal land-use plan (CLUP) vote comprising multiple projects in the canton of NE is included as well.

degrees of priority to these projects. Hence, the diversity can be read as a testament to political will in implementation procedures more generally.

If a fictitious project were to take an average amount in all stages, it would end up with a duration of around 180 months or 15 years.[141] The first stage after the met mast approval is the fixation in the CSP. On average it takes place 41.7 months afterwards, but it may happen 115 months (9.6 years) before or 174 months (14.5 years) afterwards. It is telling that, on average, developers begin with the pre-project (planning the LLUP-adaptation is called the "pre-project") 19.7 months before the CSP has been fixed. But here as well, the range of starting points with a length of 188 months (15.6 years) is extremely large. The IEA is then started subsequently, normally concurrently with the pre-project, but it may also have started before as part of field exploration mandates or start much later when the pre-project is already well under way. The pre-project and/or the IEA are handed in to the canton almost three years after the beginning of the IEA. The negative 25 months are indicative of a hand-in of a pre-project without an IEA (low-capacity project or different lead procedure; see section 5.2.3.).

After a pre-project has been pre-approved by the cantonal authorities, a public consultation is made possible for 30 days. Pre-approval generally comes with reservations attached to a later pre-project decision (mostly by municipalities). The survey inquired about these reservations, and one can report that, on the range from zero to nine subject areas, a mean of 4.13 topics were reported as reservations (2.74 SD).[142] Public deposition of the LLUP-documents enables everyone to consult the planning dossier and check whether they want to make objections. This consultation starts on average three years (36.5 months) after the pre-project was handed in to the authorities, but this deposition can take as long as 12.25 years (147 months). If objections are made, the competent municipality negotiates to settle. Yet it does not have to reach an amicable agreement. Following these negotiations, the municipality takes a decision to validate or refute the LLUP. In most cases, the municipal assembly judges this, but there are also two cantons (FR and SO) in which this LLUP-decision is made by the municipal executive (see

141 Please note that interpretation over multiple stages signifies multiple means-taking, which reduces estimate precision.

142 As for the conditional stipulations on the construction permit (see section 5.2.2.), these subject areas are narrowly defined as topics of turbine impact, e.g. "noise", "water", "forest", "flora and fauna", etc.

section 5.2.3.).[143] On average, the vote takes place 18 months (1.5 years) after public deposition of the LLUP.[144] The data show that maximally the popular vote happened twelve years (148 months) after the pre-project was made public for consultation. In the most common case (except in special land-use plan procedures; see Abegg and Dörig 2019, 31), cantonal authorities must validate and approve of the municipal acceptance of the pre-project.[145] On average, the cantons approve pre-projects 10.4 months after it has been voted on, with a maximum of 51 months (almost five years) later.

Once approved, organizations and private persons may lodge complaints and go to court if they have previously made an objection. If either the courts have reached their final verdict or no courts or pre-stages to the court are called, the procedure moves on to the second public consultation, this time of project documents that apply for a construction permit. The construction permit also includes an operation permit under the condition of electrical safety approval (and the aviation obstacle permit). The public deposition may happen up to 35 months before cantonal pre-project approval or up to 147 months (12.25 years) afterwards. On average, however, it happens 14 months (1.2 years) after the pre-project has been cantonally approved. Then, there is a second opportunity for objections, and if they are entered, a second negotiation phase takes place. Again, no agreement must be reached, but amicable settlements are much preferred. The electrical safety authorization, which is usually part of the total construction permit dossier, is then approved on average 18.2 months (1.5 years) later. But it may take up to 73 months (6.1 years) for this to happen. The electrical safety-authorization is granted very close to, or concurrently with, the construction permit. Respecting the coordination clause (Art. 25 RPG) on average at least, they are handed out together, but it has been received seven months prior or five months after the first-instance construction permit. The granting then enables a second cascade of court cases. On average, before a construction permit becomes legally binding (final), this takes another 21.4 months (1.8 years), but it may

143 The stage of the municipal assembly vote(s) excludes such executive decisions but includes cantonal popular pronouncements (in NE).

144 The negative 24 months stems from a cantonal vote in NE on a cantonal land-use plan (CLUP) that happened before the detailed planning documents were made available for public consultation. Because the vote was cantonal, there was no formal role of the municipalities in making documentation publicly available.

145 Also in the canton of NE, the cantonal approval under condition of popular acceptance of the pre-project happened 81 months (6.75 years) before the NE-citizens accepted it.

Table 5.5: Possible delays due to CSP-enactment.

Variable	Min	Max	Mean	SD	N
Project blocked by elaboration of CSP (N/Y)	0	1	0.48	0.5	56
Duration of project blocking through CSP (in months)	6	118	54.76	30.04	25

Table 5.6: Descriptive assessment effort data.

Variable	Min	Max	Mean	SD	N
Municipal assessment effort (index)	0	3	1.68	1.05	47
Cantonal assessment effort (index)	0	3	1.49	0.86	41
Federal assessment effort (index)	0	2	0.35	0.68	85

take up to 7.75 years. The legally binding construction permit that includes the electrical safety authorization (and other side-permits that are not shown on the graph) then concludes the completed authorization procedure.

Delays due to CSP-enactment

Next, developers who experienced a non-finished CSP at the time of their handing-in of the LLUP to the canton were asked about whether they felt that their project was being blocked because of it. Almost half answered that the CSP-elaboration blocked their projects temporarily. The subsequent question then asked those whose projects were blocked how long their projects had to remain inert because of this. With an average of 4.5 years (54 months), going up to almost ten years maximally, this is a very long project resting period. I also asked whether developers faced economic, organizational or reasons of natural conditions to temporarily delay the project. About a quarter of the sampled projects had to temporarily put their projects on hold for such other reasons. In terms of duration of this temporary stop for other reasons, it is similar to the estimated delay due to cantonal planning (not pictured).

Public assessment effort

Another key metric by which one may classify Swiss standard and low-capacity WE-projects is the self-declared effort by cantons or municipalities that is needed to assess these projects. For the cantons and municipalities a "0" means that no previously unknown assessment and organizational process needed to be initiated for the project under consideration, whereas a "3" indicates that a major overhaul of established processes was necessary to evaluate and organize the treatment of said projects. On average, municipalities are slightly more procedurally challenged than cantons, and they show a larger dispersion. But the difference is not large. However, the clear middle-finding for both categories of actors indicates that WE-projects pose procedural challenges to both municipalities and cantons. The scale for the federal assessment effort item is slightly different: A "3" is attributed to those projects that required in-depth considerations by three or more federal offices (separated from each other on an aggregate level, e.g. BAFU, ARE, BFE, ESTI, etc.). "0" is given to projects that required no in-depth considerations from any federal office; a "1" and "2" are allocated to projects that required in-depth treatments of one or two federal offices, respectively. The data show that in sum WE-projects are not a major and constant concern for federal office workloads, except of course for the small WE-section at the BFE including the "guichet unique", whose daily job it is to coordinate, assess, support and share expertise. This finding is in stark contrast to the challenges that municipalities and cantons face in their own WE-assessments.

Planning expenditures

Planning WE-projects and getting them authorized is a costly affair. Table 5.7 gives some indications on this topic. Because these data are sensitive, the study refrains from showing minimal and maximal expenditures or the number of projects on which these data are based on.

Contentwise, it is clear that developers carry by far the main financial burden for all plannings, including environmental assessments and studies on possible compensation measures. In some cantons, authorities, when evaluating the complete dossier, charge developers for the public's assessment efforts. Yet these more or less "symbolic" amounts invoiced do not reflect the true cost of evaluation by the cantons. However, as is argued by some stakeholders, evaluations are part of the authorities' core tasks, and they should therefore not charge developers at all (interviews 15, 20). Others maintain the opinion that assessments of for-profit projects should not be covered by taxpayers, as they gain nothing concrete in return (this is obviously different for electricity plants). Hence, in most cantons and cases, public costs for evaluating the IEA are partly passed on to developers, but only as a fraction of its true cost.

Developers with projects in phase 3 (in court cases, otherwise final) or 4 (operational) have planning costs (excluding construction costs) of over CHF 2 million on average. The very large standard deviation shows a very large dispersion, however. Given that the mean is smaller than the standard deviation, the developer expenditure data are highly skewed to the right, as are cantonal invoiced IEA costs for that matter. Developers were further asked about their full-time equivalents (FTE) on the project over time. It is shown here as the sum of percentages across years (1 FTE across five years would be noted as 500%). The mean of a bit over 500% could be understood as ten years of work at 50% for one person. What is notable here is again the large standard deviation of almost 400%. This shows that some developers engage more in-house resources for a project, whereas others see their role mostly as a coordinator between otherwise externalized mandates to fulfill legal requirements. To capture municipal costs, host municipalities were asked about their spatial planning budget and their employment costs during the time that they evaluated the project. The objectively limited but nevertheless substantial costs, especially to municipalities with smaller populations that are typically hosts to WE-projects, are reflected in these two estimates. The difference between the two estimates also shows that municipalities evaluate aspects of the projects on their own account but also outsource some tasks on average by about CHF 40'000.

Extensiveness of participation in planning

WE-projects also differ by the degree of stakeholder participation during their authorization procedure. There are projects where stakeholders are invited to co-determine important aspects of the project (e.g. environmental compensation priorities), and there are projects where simply the legal minima given

Table 5.7: Descriptive planning-expenditure data — excluding construction costs of projects in phases 3 and 4.

Variable	Mean	SD
IEA costs transferred to developers	24’501	35’380
Developer’s planning costs	2’080’444	2’315’704
Developer employment % multiplied by time (in %)	506.77	394.68
Municipal spatial planning budget during project evaluation time	94’063	74’453
Municipal employment costs	55’800	96’263

Notes: Expenditures in CHF.

by the federal law on spatial planning (Art. 4 RPG) are respected. Table 5.8 captures this variety of “participatory planning styles”. To evaluate the extent of participatory opportunities, developers and municipalities could rate it separately: A “0” in the scale from 0–3 indicates non-existence of participatory opportunities, a “3” indicates multiple, wide-ranging participation opportunities.[146]

Unsurprisingly, municipalities rate the participatory opportunities on average a little less encompassing than developers. Nevertheless, for municipal participation a clear middle-ground finding could be detected with large standard deviations. Full co-determination of central project planning aspects (e.g. precise location, height) has not been offered to the public due to fear of fundamental opposition canceling the project altogether (to the author’s knowledge). Side-aspects of the projects, which, for example, consider where to compensate environmental impacts with which measures, are routinely put up for public discussion, usually after experts present various options.

Municipalities also “participate” in that they are accorded a wide range of potential benefits if they agree to host. In many cases, local companies are founded and thus pay taxes in the host municipality. Classically there are also examples of the municipal inhabitants receiving a standardized amount of “free” electricity for each year, or an environmental compensation measure

146 A “1” is attributed to few and limited participation opportunities and a “2” to many proposed participation measures of limited range.

Table 5.8: Descriptive involvement and participation data.

Variable	Min	Max	Mean	SD	N
Extent of organization involvement, judged by municipalities (index)	0	3	1.63	0.84	51
Extent of organization involvement, judged by developers (index)	0	3	1.83	0.9	24
Extent of municipal benefits from the project (index)	0	3	1.77	0.88	37

is extended to cover a nature infrastructure project that the municipality has long wished for, local sports teams are sponsored, tourism incomes are generated, etc. Recently, developers have also begun to promote direct citizen ownership of the operating company (a model that is known in Germany as “Bürgerwindpark”; see Knauf 2022; Maruyama et al. 2007; Curtin et al. 2019; Mayer et al. 2021; Vuichard et al. 2019), where citizens buy and receive operator shares and the corresponding profits. The most advanced and famous example in Switzerland is the initiative by a former member of parliament in the canton of NE and his project “l’éolienne des enfants” (“the children’s wind turbine”) for the project of the “Quatre Bornes” in the cantons of NE and BE.[147] Here, children, represented by their legal custodians until age 16, can buy a share and reap the benefits in exchange for putting their savings into a share. Once the turbine is operational, they figuratively “own” a part of a selected children’s turbine in the park.

In order to find out the extent of benefits municipalities are given (or promised if the project is not yet operational), I asked developers and municipal representatives about the extensiveness of municipal benefits. I then rated them in ascending order of their importance to the municipality and its inhabitants. A “0” of the index means “no benefits received at all” and a “3” indicates that “many wide-ranging benefits” were received.[148]. It turns out that the mean project, again, very much occupies a middle-ground with regard to benefits, with most carrying marginal to medium importance to municipal inhabitants, municipal life and its finances. The wide dispersion

147 See leoliennedesenfants.ch.

148 A “1” was attributed in case “some marginal benefits were received”, a “2” was accorded when “some important benefits were received”. I coded this scale myself, based on qualitative questions about beneficial measures in the PCS.

shows, however, that there are many developers who provide many and wide-ranging beneficial opportunities, but about equally as many provide only marginal benefits.

In the specialized literature, the conditions under which participation and benefits in infrastructure projects foster their acceptance are controversially discussed (Batel et al. 2013; Schweizer and Bovet 2016; Wüstenhagen et al. 2007). In wind energy, participation is no panacea, as the German deployment experience has demonstrated (Fraune and Knodt 2017). For the Swiss projects, the author calculated whether greater participation opportunities correlate with higher acceptance in voting on the LLUP (not pictured). There is no evidence to support this claim. This might be an artifact of the small number of projects that could be used to calculate these correlations. Yet this tentative finding, tentatively corroborating the German experience (ibid.), indicates that more participation does not necessarily lead to higher acceptance. More participation opportunities are likely to attract more (fundamental) opponents as well.

Popular votes

Table 5.9 depicts the average yes-vote share in municipal and cantonal votes in concrete relation to a WE-project.[149] Looking at the binding ballots, one is looking at a range of yes-votes of between 30%–100%, with half of the projects being accepted with more than 60% yes-votes. The standard deviation of 18.8% shows that the acceptance threshold of 50.01% is only 0.71 SD away; hence, refutation of projects is very much also the norm. In total, 73% of binding votes on LLUPs or construction permits votes were decided in favor of concrete projects. Since the ES 2050, acceptance has declined: Since then, out of six binding LLUP or construction permit-votes, three were accepted and three refused.

Regarding the consultative votes, the findings are less robust, because there are not many of these votes that took place. The mean of this latter category of votes is much more negative with a mean yes-vote share of 34.8%, a minimum of an almost complete refutation and a maximal 82% voting yes. It seems that in consultative votes people are much more critical of

149 Excluded from these popular vote data are municipal and cantonal policies (such as moratoria, initiatives) that are not directly related to a concrete project. Included are votes on projects between 01.01.2000 and 31.12.2021.

Table 5.9: Yes-vote share summary data on WE-projects.

	Binding votes	Consultative votes
Min	30%	0.01%
Max	100%	82%
Median	60%	33%
Mean	63.34%	34.81%
SD	18.75%	27.42%
N	35	11

projects. An explanation might be that consultative votes are often called for by opponents to deter developers from further developing a project in the beginning months of planning. At this stage in the concrete planning process, a well-developed basis for discussion is rarely available. However, a 50.01% yes-vote share in a consultative vote can be reached by adding only 0.55 SD to the mean, so a "yes" is a likely outcome as well, despite the mean and median clearly being below the acceptance threshold.

The social acceptance of WE-projects has been a very strong point of contention, with opponents pointing to a mean non-favorability of all municipal and cantonal votes towards WE in Switzerland (Freie Landschaft Schweiz 2023a). However, they mix all votes on WE together, be it on projects or regarding initiatives, be they consultative or binding. This is difficultly permissible, as there are arguably very different dynamics behind voting behavior if it is on a concrete project or not and if it is binding or not. Indeed, if one takes a look at moratoria or initiatives on WE, the mean outcomes are non-favorable to WE on average. Put differently, in municipalities where such initiatives or moratoria are launched, their outcomes tend to be well beyond the mean against WE. Some of these propositions are formulated neutrally, yet I am not aware of a direct-democratic proposal that has sought to change rules *in favor* of WE. Still, success depends on perspective: If the point of comparison is those municipal and cantonal votes that were taken, then the outcome is clearly non-favorable to WE. If, however, silence means favorability and one compares the votes to all other municipalities (and cantons) that are potentially suitable to WE-projects and have not adopted a measure, then opponent success would be well below the mean.

As community acceptance (for the term, see Wüstenhagen et al. 2007) is so prominently discussed in the social science literature on WE, these descriptives require some further comments. It is indeed the branch of the literature on WE that has been developed most extensively, not only internationally (Knauf 2022; Schneider 2022; Dütschke et al. 2017; Batel et al. 2013; Gross 2007; Wolsink 2012) but also for the case of Switzerland (Stadelmann-Steffen and Dermont 2021; Stadelmann-Steffen et al. 2018; Vuichard et al. 2019; Cousse et al. 2020; Schneider 2022). This literature argues that the major keys to understanding why the procedures are ineffective and inefficient are lacks of acceptance, and behind the lack of acceptance lie lacks of participation or of procedural or distributional justice.

A prominently discussed phenomenon, especially in the earlier literature, has been dubbed as "NIMBY" ("not in my back yard"), debating whether there is a gap of people's beliefs about WE in general and about those projects for which people have skin in the game (Devine-Wright 2014; Bell et al. 2005; Petrova 2013; Rand and Hoen 2017). This debate has been linked with the discussion on measuring the distance between a WE-project and acceptance rates, where there is exemplary evidence that being affected by wind turbines leads to a more positive evaluation (Langer et al. 2018).[150]

In the Swiss context, aside from case studies (Spiess et al. 2015; Blake et al. 2020; Cherqui and Bombenger 2019), community acceptance has been debated in a relatively inconcrete manner, often using surveys and survey experiments and resorting to hypothetical projects or characteristics of a few local examples (Stadelmann-Steffen and Dermont 2021; Ebers and Wüstenhagen 2017; Tabi and Wüstenhagen 2015; Walter 2014; Cousse et al. 2020; Vuichard et al. 2019). There have even been laboratory experiments to test for acceptance rates after exposure to images and sounds of wind turbines placed in regional landscapes (Ribe et al. 2018; Schäffer et al. 2019; Manyoky et al. 2016). However, what has not been provided so far are simple descriptives on the full set of votes on WE-projects in Switzerland as a basis for further quantitative exploration, which is what the present study seeks to do.

Overall, the means described could not be immediate causes of alarm, because the mean of binding yes-votes by the citizens of 63.34% (SD 18.75%) is close to the mean of all environmental and energy referenda by Swiss citizens of a yes-share of 63.46% (SD 14.3%, national level since 1848;

150 There is also a study finding null-effects for the United States between geographic proximity and acceptance; see Mayer et al. 2021.

Swissvotes 2023). Compared to all types of votes in federal environmental and energy matters since 1848, with a yes-share of 49.56% (SD 17.3%; ibid.), it is even 13.7% of yes-votes higher. Hence, compared to national votes on related subjects, binding WE-project votes have shown similar to even greater acceptance rates.[151]

With regard to the findings of social acceptance literature with residents and/or WE-projects in Switzerland, a few notable conspicuities may be cited: Concerning the baseline probability compared to other renewable technologies, Stadelmann-Steffen and Dermont (2021) find that respondents are most critical regarding geothermal and wind energy compared to PV and small-scale hydropower, whereas Tabi and Wüstenhagen (2015), in a representative survey on WE-projects in Eastern Switzerland, still find overwhelming support (76%) for the development of turbines in the surroundings of the respondents. The most often cited points of contention are aesthetics, meaning visual landscape and heritage impacts, but also regional economic development, biodiversity and, to a lesser degree, financial risks, questions of economic feasibility and aspects of procedural unfairness (Cherqui and Bombenger 2019; Blake et al. 2020; Spiess et al. 2015). Tabi and Wüstenhagen (2015) have also reported that the majority of their respondents (69%) were open to making compromises and accepting trade-offs concerning impacts on the landscape and possible environmental compensation measures. With regard to factors that have been found to increase socio-political and/or community acceptance, a low environmental impact of a WE-project and ample degrees of participation were found to heighten support (Tabi and Wüstenhagen 2015; Ebers and Wüstenhagen 2017). Ex-post evaluations of noise and landscape impacts with people in the host municipality of Haldenstein (GR) and the immediate neighboring municipality of Landquart (GR) were also found to be considerably more positive than in anticipation of said project ("Calandawind"/GR). Having a local electrical company as a developer or operator is also seen as a support-furthering factor, in addition to securing municipal/local financial gains (Ebers and Wüstenhagen 2017). Among the different models of financial participation, Vuichard et al. (2019) found a local resource tax pricing the wind (akin to the "Wasserzins" for hydropower plants) that benefits the municipality to be the most highly supported model.

151 N of all types of votes on environmental and energy matters since 1848 = 112. N of referenda votes on environmental and energy matters since 1848 = 41. Only population yes-shares are counted, not cantonal yes-shares.

Table 5.10: Descriptive legal complaints data.

Variable	Min	Max	Mean	SD	N
Complaints by persons and companies (index)	0	3	1.55	1.2	20
Complaints by associations (index)	0	3	1.83	0.9	24

Concerning “NIMBY", the principle itself has been invalidated in studies on international WE-authorization cases (Wolsink 2012, 2006). In a survey with five municipalities that have been involved in a concrete WE-project, Walter (2014) has found that the general attitude towards WE can be considered a strong predictor of local acceptance, even though there are significant differences between the two. This would suggest the presence of a significant incongruity between general and local preferences. However, Tabi and Wüstenhagen (2015) found no difference between general acceptance for WE and its development in the respondents’ own municipality. Hence, there are no generalized findings from the NIMBY-literature that can be derived for Switzerland.

The social acceptance findings from case studies are difficultly comparable internationally. In one of the few cross-country surveys that include Switzerland, no systematic differences were found between countries regarding the points of contention and concerning ideas on how to mitigate them (Ebers and Wüstenhagen 2017; Wolsink 2012).

Extensiveness of complaints

WE-projects further differ by the complaints they accumulate against themselves. Table 5.10 differentiates between complaints made by citizens and companies and those made by associations. To measure their weight, I constructed a categorical index, the same for both measures: A “0” indicates the non-existence of formal complaints, a “3” a very extensive, coordinated opposition. The categories “1” (minor, uncoordinated) and “2” (minor and coordinated or extensive but uncoordinated) provide the middle-ground. The two items describe that in the project population there were projects that provoked no opposition as well as projects that did so extensively. On average, citizens and companies tend to lodge complaints in a less coordinated and/or less extensive way than associations. For citizens, the data provide evidence for a medium-strong counter-engagement. Assuming a normal distribution, 68% are within plus or minus 1 SD or within the range of 0.35–2.75. This shows that there is a broad range of private citizen counter-engagements in the sample. The data further show that the range of associational engagement against WE-projects is smaller and higher on average. Again assuming normality of the item's distribution, 68% of the sample's projects are expected to be above an index-score of 0.93 (compare this to a score of 0.35 for citizen and company counter-engagements).

5.4. Main actors involved in wind energy-implementation arrangements

Following the analytical model of this study (see section 2.4.4.), this section will describe who the main actors are, how they tend to be related in institutional arrangements and how they are embedded in the institutional and policy context. In addition to actor capabilities that are focused on first, actor orientations will later be discussed as well. The main actors were divided into the following five categories: cantons, municipalities, federal agencies, developers and interest associations. Given that the topic of cantonal decentralization is predominantly a municipal and cantonal affair, most attention will be spent on them.

5.4.1. Cantons: differences between project hosts and non-hosts

Out of the 26 Swiss cantons, there are 17 that host WE-projects (henceforth "WE-cantons") and nine that do not (henceforth "non-WE-cantons").[152] Seven of the total of 85 projects are bi-cantonal. How do these two groups of cantons differ from each other regarding the institutional context and implementation capabilities?

A first partial answer to this question shall be based on the institution of decentralization, as measured with Mueller's (2022) index (see section 3.1.2.). Table 5.11 shows the means of the WE-cantons and those of the non-WE-cantons. Based on the Shapiro-Wilks test (1965) and its result of whether

152 AG, AI, BE, BL, FR, GL, GR, JU, LU, NE, SG, SH, SO, TI, UR, VD, VS host projects, whereas AR, BS, GE, NW, OW, SZ, TG, ZG, ZH do not, following the project-population selection criteria in section 5.3.

Table 5.11: Comparison of decentralization means between WE- and non-WE-cantons for Mueller's (2022) index.

Item	**Coding/ theoretic range**	**WE-means**	**Non-WE-means**	**P-values**
Cantonal decentralization	Z-scores	-0.08	0.15	p(T):
Polity	Z-scores	-0.3	0.56	p(T): ***
Giacometti 1941	Ord., 0–2	1	1.67	p(W): **
Perceived local autonomy (ct. means) 2017	Ord., 1–10	4.69	5.51	p(T): ***
Policy	Percent[3]	78'997.95	91'397.49	p(T):
Expenditure: m. of ct., mean 2000–2018	Percent	55.79	55.8	p(T):
Income: m. of ct., mean 2000–2018	Percent	56.19	56.09	p(T):
Personnel dec.	Percent	42.65	43.94	p(W): **
Administrative dec.	Percent	50.71	46.9	p(W):
Politics	Z-scores	0.13	-0.24	p(T): *
Electoral dec.	Ord., 0–4	1.8	2.05	p(T):
Representational dec.	Percent	0.13	0.09	p(W): *
Directdemocratic dec.	Ord., 0–4	1.65	0.56	p(W): *

Notes: "ct." is short for cantonal, "m." for "municipal", "dec." for "decentralization", "ord." for ordinal, p(W) for p-value of the Wilcoxon-test, p(T) for p-value of the t-test. $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$. All data sources are indicated in table B in the online appendix.

normality in the data can be assumed or not, two-sample two-sided means comparisons tests were applied. If normality could be assumed, student's t-test (Gosset [student] 1908) was applied; if not, the Wilcoxon-test was used (1945; Mann and Whitney 1947).

Substantively, what meets the eye first is the overarching significance of polity variables. The full polity score is significantly lower in cantons having WE-projects than in cantons that do not. This is also true for its components, where WE-cantons are experiencing lower degrees of formal legal autonomy following Giacometti (1941) and also significantly lower degrees of perceived local autonomy, using updated data from the municipal secretary survey 2017 (Ladner et al. 2021). WE-cantons are thus *less* decentralized in their legal (formal) or locally perceived legal decentralization.

Regarding the second dimension of decentralization, the policy dimension, there is no statistical difference between the mean of WE-cantons and non-WE-cantons. This dimension can be said to measure cantonal capabilities. Both cantonal groups practically have the same relative financial capabilities, in both expenditure and income. Regarding the statistically significant personnel difference, WE-cantons tend to have slightly lower relative personnel resources and thus smaller capabilities for action, but this cannot be explained through smaller spending on general administration where there is no statistical difference.

However, cantons with WE-projects are more decentralized in the politics dimension than non-WE-cantons. The significant item of representational decentralization (see section 3.1.2.) indicates that there are more politicians that have mandates on both the cantonal and municipal governments or a stronger municipal association supporting municipal interests on the cantonal level. WE-cantons also have significantly stronger powers regarding their direct-democratic force to challenge cantonal legislation and propose new cantonal legislation. In summary, WE-cantons thus have lower polity decentralization, unsubstantiated policy decentralization differences, and higher politics decentralization values.

One should be careful not to overinterpret simple means differences of the institutional context (and of the capabilities). These might be fully spurious and might not be related to WE-projects. What will be seen later is that perceived local autonomy, electoral and direct-democratic decentralization as well as personnel decentralization will retain significance in controlled correlations, while Giacometti's measure (1941) will not. With these statistical means differences it could well be the case that there are common confounders at

Table 5.12: Comparison of geophysical, cultural, demographic and economic conditions between WE- and non-WE-cantons.

Item	**Coding/ theoretic range**	**WE-mean**	**Non-WE-mean**	**P-values**
Wind harvesting potential (2020)	Ord., 1–5	2.52	1.56	p(W):
French-speaking (2016)	Ord., 0–1	0.18	0.11	p(W):
Population (2017)	In 1'000's	329.32	320.64	p(W): *
Population density (2017)	Per km^2	211.49	1'084.35	p(W): *
Surface area (2004–2009)	In km^2	2'123.21	577.32	p(W): ***
Employed in agriculture (2017)	Percent of total workforce	7.63	3.68	p(W): **

Notes: "Ord." is short for ordinal, p(W) for p-value of the Wilcoxon-test; $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$. All data sources are indicated in table B in the online appendix.

the source of these differences. One potential confounder is especially meaningful in this decentralization-context: Mueller (2015) found that cultural differences between the Romandie and German-speaking Switzerland were the most important driver of decentralization variance. For the observer this seems a likely explanation for the decentralization differences reported above, especially because there is an underrepresentation of German-speaking cantons in the sample hosting WE-projects. If French-speaking cantons were indeed uniformly less decentralized in polity and uniformly more decentralized in the politics dimension, the cultural difference could explain these institutional differences. Hence, it is imperative that cultural controls be included in the analyses that follow.

Moving on to "other" contextual conditions (see section 2.2), table 5.12 presents physical, cultural, demographic and economic context conditions that are likely confounders of the institutional context effects on PSE. Starting with the most counterintuitive finding first, the differences in WE-harvesting potential between the two groups of cantons are insignificant: Although on the scale of 1–5 (low to high) the mean potential in WE-cantons is almost a point higher, the difference still is insignificant statistically. Neither could there be found a statistical difference in means between the fully French-speaking cantons and the others. Officially bilingual cantons (BE, FR, VS) were excluded from this count. Other than GE, all fully French-speaking cantons host WE-projects (75%). Of the officially bilingual cantons, 100% are hosts. Of the German-speaking cantons (GR included for simplicity reasons, TI excluded), the percentage of hosts is 56%. The lack of statistical significance means that this difference should not be interpreted.

In line with the finding that host municipalities are more rural (see table 5.2), the mean population density is much lower in WE-cantons than in non-WE-cantons. However, WE-cantons are larger in terms of population than their counterparts. Moreover, WE-host cantons are statistically larger in terms of their territory. In addition, the percentage of people working in agriculture is more than double in WE-cantons than in non-WE-cantons. At first glance, checking for this contextual condition, this appears to be random, but given the fact that farmers have been involved in initiating WE-projects in Switzerland, checking for this artefact will be necessary in the analytical models.

5.4.2. Municipalities: differences between project-hosts and non-hosts

Within the 17 WE-cantons, there are 121 WE-municipalities that host standard-sized or low-capacity projects. Six municipalities (5% of municipal hosts) host two projects, one hosts three (0.8% of municipal hosts). In terms of project-numbers, 18% of WE-projects are hosted by multiple-project municipalities. The distribution of projects across municipalities is as follows: 59 WE-projects (69%) are hosted by a single municipality, 13 (15%) by two municipalities, six (7%) by three, six (7%) by four and one (1%) by five municipalities. There are important differences between those municipalities that host and those that do not, as shall be demonstrated now.[153]

153 As in the previous section on cantonal differences, Shapiro-Wilks-tests (1965) showed that the assumption of normality cannot be maintained for all items, which is why only non-parametric Wilcoxon two-sample rank sum tests (1945; Mann and Whitney 1947) were conducted.

The comparison of the municipal-level decentralization measure and municipal capabilities across both municipal groups is depicted in table 5.13. The only decentralization measurement that is available on the municipal level is the perceived local autonomy item from Ladner et al.'s (2021) municipal secretary survey that Mueller (2015, 2022) used as part of his polity-decentralization index. It shows no statistical difference of means between municipalities. This is astonishing as this variable difference, as we have seen, is highly significant in cantonal comparison (see table 5.11). This comparison, as will be demonstrated later, misses the crucial control of being nested in cantons.[154]

Aside from decentralization, there are plenty of items measuring aspects of municipal capabilities on which the two municipal populations differ. WE-municipalities tend to have a greater degree of professionalization: They have on average more full-time executives, and the share at which the municipal president (or mayor) is employed is higher. They are also very different with regard to the problems they see in their municipal work: WE-host municipalities report a higher lack of finances, a greater lack of necessary knowledge, a greater distance to their constituents, and they report more frequently that administrative processes are too complicated; they view the problem of an administration lacking operative freedoms as more pertinent to them and answered more frequently that their tasks are not defined clearly enough. Overall, on average, WE-municipalities feel more challenged in their work than their counterpart non-hosts. Host municipalities also tend to have more financial resources at their disposal.[155] However, municipalities do not differ regarding the perceived administrative service capacity.

Concerning policy conditions that are likely to shape a WE-authorization procedure, table 5.14 shows municipal challenges and political priorities. WE-municipalities that have already been shown to be administratively challenged to a greater degree in the preceding table are also closer to their performance limits regarding the handing out of construction organizations than non-WE-municipalities. However, the data indicate that they are not more challenged regarding spatial planning, (electrical) power supply, environmental protection, and landscape and buildings protection than the

154 This will be investigated in depth using logit, survival models and multiple linear regressions.

155 This stands in contrast to the difference between cantons in personnel resources, where WE-cantons tend to have less. This will also be investigated in detail using regressions.

Table 5.13: Comparison of decentralization and capacities means between WE- and non-WE-municipalities.

Item	**Coding/ theoretic range**	**WE-M. mean**	**Non-WE-M. mean**	**P-value Wilcoxon-test**
Decentralization on municipal level				
Perceived local autonomy	Ord., 1–10	4.55	4.6	
Municipal capabilities				
No. of voluntary executives	Count	5.19	5.31	
No. of part-time executives	Count	2.74	2.71	
No. of full-time executives	Count	0.9	0.43	*
Municipal president employment	Percent	60.73	50.43	**
Total executive employment	Percent	156.05	121.43	
Admin. lacks finances	Ord., 1–5	2.78	2.49	**
Admin. lacks knowledge	Ord., 1–5	2.2	1.95	**
Distance to people served too large	Ord., 1–5	1.76	1.55	**
Admin. processes to complicated	Ord., 1–5	2.83	2.54	*
Admin. lacks operative freedom	Ord., 1–5	2.78	2.45	**
Admin. tasks are not defined clearly enough	Ord., 1–5	2.3	2.08	*
Admin. service capacity	Ord., 1–10	7.83	8	

Notes: “Admin.” stands for Administration, “m.” for municipal. *$p<0.05$; **$p<0.01$; ***$p<0.001$. All data sources are indicated in table B in the appendix.

non-hosts. All differences are not only insignificant but point in the direction of WE-municipalities being more challenged. Regarding political priorities, it is not surprising that WE-municipalities attach greater significance to the area of energy policy than the non-host municipalities. What surprises is, however, that construction politics and the federal ES 2050 are not more important to WE-municipalities than to the non-WE-municipalities. These findings lend the impression — already detected in the capabilities discussion above — that WE-municipalities are slightly more challenged by (sectoral) context conditions if they host WE-projects, but the additional policy challenge is not very large in magnitude and remains partial. Indeed, from an observer's point of view it seems striking that these municipalities are not challenged much more given the debate on the difficulties of being involved in a WE-project.

With regard to the geographic, demographic and cultural context, the conditions depicted in table 5.15 all are significant except for the population number. WE-municipalities speak disproportionately more French than German. Almost half of the host municipalities are in the Romandie, whereas only 27% of the non-hosts are there. As a comparison: Of the 2'255 (political) municipalities in Switzerland in the year 2016, 28.8% (650) were in the French linguistic region. The non-French-speaking municipalities (71.2% in 2016) have taken on only 27% of the projects. Assuming that these shares have not or only slightly changed until today, the fact that half of the projects are hosted in French-speaking municipalities shows that they take on more than double as many projects than they would if the projects were equally distributed across language regions. Furthermore, WE-municipalities have much lower population density and are much larger in terms of their territory. As we have already seen for the cantons, WE-host municipalities also have many more farmers as well. The average municipal type shifts from a non-WE-municipality being on average a "periurban municipality with medium population density" (type 5) to a "periurban municipality with low population density" (type 6). Overall, WE-municipalities are thus significantly more rural than non-WE-municipalities but also larger in terms of surface area.

5.4.3. Federal agencies

The following five federal agencies ("Bundesämter") are mainly involved in concrete coordination processes outside of specific technical consultations: BFE, ARE, BAFU, BAZL and ESTI. The latter two have outsourced some

Table 5.14: Comparison of means of sectoral policy conditions between WE- and non-WE-municipalities.

Item	**Coding/ theoretic range**	**WE-mean**	**Non-WE-mean**	**P-values**
		Performance limits as indicated by municipality		
Construction authorizations	Ord., 1–4	2.02	1.82	*
Spatial planning	Ord., 1–4	2.03	1.97	
Power supply	Ord., 1–4	2.37	2.33	
Environmental protection	Ord., 1–4	1.87	1.67	
Landscape & buildings protection	Ord., 1–4	2.12	1.9	
		Significance of policy field to municipality		
Energy	Ord., 1–5	3.63	3.26	***
Construction	Ord., 1–5	3.89	3.92	
Energy strategy 2050	Ord., 1–5	2.86	2.92	

Notes: “M.” stands for “municipal”. *p<0.05; **p<0.01; ***p<0.001. All data sources are indicated in table B in the online appendix.

tasks to private organizations. The BAZL mandates a private consulting company to collect their data and mapping representation on aviation obstacles but handles permitting of such obstacles itself. In the case of the ESTI, the permitting procedure has been fully outsourced to the sectoral association "Electrosuisse" that is concerned with electrical certifications, vocational training and engineering consulting, among other tasks.

There are various "side arenas" in addition to coordination with the major five federal agencies named above. For one, there is the issue of grid access. A private joint-stock company named Swissgrid, which fulfills what had been the federal task of maintaining highest-voltage transmission lines (grid level 1 at 380kV to 220kV) until 2009, must be consulted when lower grid-level applications, such as WE-projects on levels 3 and 5, access the grid.[156] Moreover, there are supraregional (e.g. Axpo, BKW) grid distributors that manage grid level 2 (together with Swissgrid) and parts of level 6, but mainly levels 3, 4 and 5. The household grid level 7 is then managed by regional or municipal companies. Hence, for WE-projects that enter on levels 3 and 5, grid access and reification is primarily to be coordinated with the supraregional distributors.

Regarding highly specialized and technical questions, the Swiss military, the Federal Office of Communications (BAKOM), Federal Office of Meteorology and Climatology (MeteoSchweiz) and the Swiss air traffic management company Skyguide make their interests heard regarding potential impacts of a turbine's rotor blades on their communicational, safety and measurement infrastructure. The federal commission on nature and heritage protection (Art. 25 NHG)and its cantonal counterparts discuss impacts on built heritage and nature. Given the substantial international commitments regarding biodiversity, flora, fauna and built heritage, this commission operates under dense webs of legal rules. This federal commission (ENHK) may be complemented or replaced by representatives from the Federal Office of Culture (BAK) and/or the Federal Roads Office (ASTRA). These considerations are crucial and enter the BAZL's aerial obstacle permit considerations.

However, most of the federal coordination and assessment work is conducted in the agencies mentioned in the very beginning, in the ARE, BFE and BAFU. The ARE is in charge of approving the CSP (Art. 11 RPG). This

156 An independent grid owner and operator company was required by the envisaged liberalization of the electricity market as foreseen in the electricity supply law (StromVG) enacted in 2007. In 2009, Swissgrid began to overtake federal operations, and in 2013 Swissgrid became owner of the grid (Swissgrid 2023).

Table 5.15: Comparison of means of geographic, demographic and cultural conditions between WE- and non-WE-municipalities.

Item	**Coding/ theoretic range**	**WE-M. mean**	**Non-WE-M. mean**	**P-value Wilcoxon-test**
French-speaking (2000)	Ord., 1–0	0.49	0.27	***
Population (2014)	Count	4’529.02	3’571.71	
Population density (2014)	Per km^2	212.67	420.25	***
Surface area (2004–2009)	In km^2	28.07	16.72	***
Employed in agriculture (2013)	Count	106.5	72.28	***
Municipal types (2012)	Ord., 1–9	6.14	5.48	**

Notes: “M.” stands for “municipal”. $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$. All data sources are indicated in table B in the online appendix.

can easily take two years but may also take four.[157] They have also been legally in charge (Art. 13 RPG) of writing the Swiss concept of WE, the first of which has been published in 2004 and has been periodically reworked (ARE et al. 2004; Gilgen et al. 2010; ARE 2017, 2020b). In addition to the CSP approval that represents a heavy coordination and assessment workload, there is also the possibility for cantons to get pre-assessment opinions in a preliminary examination. Cantons may thus ask the ARE about proposed changes in their CSP *before* actually submitting it officially (Interview 7). But these preliminary assessments are all “goodwill”-services, they are not legally binding (Interview 5).

Preliminary examinations are possible also with the BAFU and the technical infrastructure with the various federal agencies in charge of them. These preliminaries are then collected by the “guichet unique”, the BFE’s newly established coordination office for WE-matters, which became operational on January 1st 2018 as part of the legal package of the ES 2050 (BFE 2017b). These preliminary examinations are then sent to the developer in the form of a

157 E.g. CSP-BL adaptation enacted 2017, federally approved 2021 (ARE 2023).

report — the idea being that developers really only need one "unique" federal addressee ("guichet") for all things regarding WE. This guichet unique is hosted by the BFE. The BFE's story with WE has been one of extension over time, but on a very small level (interview 5). In 2018, the 1-person WE-section at the BFE was extended to two persons, but with less than 2 FTEs in total (Interview 5). With the guichet unique, a guided federal circulation of the developer documents started to be organized, which was previously held ad-hoc. If necessary, the guichet unique also coordinates and collects federal administration statements as part of information collection of the federal courts (Interview 5). Moreover, they are also in charge of federal policy development, i.e. sketching new legislation as well and coordinating answers to parliamentary requests.

Between 1999–2005, a first yet minor subsidy-scheme called "Mehrkostenfinanzierung" (MKF) had been established on the federal level. It guaranteed a fixed amount of 15 or 16 cents per kWh to producers of renewable electricity plants (Art. 7 para. 3 EnG-old). Since 2009, based on a revision of the old Energy Act of 1998 (Art. 6 lit. a and Art. 7 lit. b EnG-old), which was decided upon when the power supply law (StromVG) was adopted in 2007, there has been a much more encompassing funding scheme that subsidizes the production of electricity from renewable sources ("KEV — kostendeckende Einspeisevergütung"), led under the auspice of the BFE. Developers of all sizes of WE-projects could get subsidized for their production (Annex 1.3 EnV-old). In practice, the administration of applications for these subsidies were managed first by a foundation under the direction of Swissgrid. With the new Federal Act on Energy (EnG) as part of the package of the ES 2050, the old system was replaced by a more diversified and less rigid system of subsidies ("EVS — Einspeisevergütungssystem"). This newer system was transferred to a different company, Pronovo AG, and was technically open to applications until the end of 2022; however, because of its limited funds, factually it did not allow more projects to enter much earlier. With regard to its current successor policies, the Federal Assembly decided in October 2022 that, starting in 2023, developers of WE-projects may be granted maximally 60% of their investment costs instead (Art. 27a EnG). This is valid for WE-projects that are handed in until the end of 2030 (Art. 38 EnG). Based on the overview of public subsidy programs by Energiefranken.ch (Faktor

Journalisten et al. 2023), there is barely any to no additional public promotion by cantons and municipalities.[158]

The BAFU is also strongly implicated in Swiss WE, generally regarding policy development but also specifically on projects: For concrete WE-projects, it is likely that its department on forests (including further consultations of the department of biodiversity and landscapes and of the section on IEAs) is involved in the cantonal decision of forest clearances, in case such a clearance is larger than 5'000m^2 (Art. 6 para. 2 lit. a WaG; see also subsection 5.2.2.). The BFE's guichet unique may also ask the diverse sections of the BAFU to make statements on diverse topics on behalf of federal courts if necessary (interview 5). The BAFU can also make statements regarding environmental impacts of grid and transformer infrastructure in the electrical safety permit procedure (see Art. 2 lit. e VpeA), but these tend to be very limited in scope (Interview 17).

Rather than for concrete projects, where the IEA, forest clearance and water protection permitting is a cantonal matter, the BAFU takes a greater role during cantonal CSP elaboration. Concerned in this regard are mostly the departments of biodiversity and landscape, forests, noise and non-ionizing radiation, as well as the BAFU's law services. In *voluntary* preliminary evaluations, the ARE — via the BFE's guichet unique — asks the BAFU to provide statements on the given cantonal information or on the status of the cantonal planning, respectively. Because diverse departments and sections are concerned, there is a BAFU-internal office that coordinates these statements (Interview 17). For matters relating to WE, this central BAFU office directs its statements to the BFE's guichet unique, unless the topic is a minor topic among many others, in which case it is in direct contact with the ARE. With regard to the *mandatory* approval of the CSPs by the Federal Council based on the ARE's assessment, the same process happens (again), but with formalized requirements that go much wider in scope and in depth; these statements are also subject to deadlines regarding assessment duration ("Ordnungsfristen"). These deadlines are unlikely to be kept given the many involved departments and the necessary organizational and topic-wise coordination, and the BAFU must frequently ask the ARE for an extension (Interview 17). Regarding WE-

158 There are promotion programs for garden-sized WE-turbines in the municipalities of Melchnau (BE), Meilen (ZH), Uetikon am See (ZH) and Küsnacht (ZH). On the cantonal level, TI provides funds for WE-projects that are not already federally supported, and GE may provide funds for "strategic projects that serve the reduction of CO_2", which possibly comprises WE-projects. An investment into WE-turbines may be deducted from federal income taxes and from income taxes in most cantons.

projects, the BAFU does not have dedicated persons that work on the topic of WE exclusively; rather, the increasing workload regarding WE-development over the years must be covered with existing resources (Interview 17).

Overall, interviewees concurred that the BFE's guichet unique, introduced in 2018, brought a more systematized treatment of all federal dealings with regard to WE-develop-ment (Interviews 5, 7, 12, 17). Most argued, however, that it is too early for an assessment of the efficiency of this "new" measure (especially interview 7). From the interviews one could also synthesize that the concrete work for projects on aerial obstacle and electrical safety permitting is decidedly smaller compared to the total federal workload connected to CSP preliminary and full examinations.

5.4.4. Associations and interest groups

Nongovernmental Organizations (NGOs) involved in concrete WE-authorization procedures are highly diverse in terms of professionalization, resources and topic-focus, as given by their charters. In the NCS, comprising the 30 more advanced WE-projects (see section 6.1.), all NGOs that take part in implementation arrangements were also included. For these 30 projects, 80 organizational opposition statements (mean: 2.67 per project) were registered.[159] These oppositions might not all have led (or are yet to lead to) objections, and not all of them have resulted in complaints later on, but many have or will most certainly. The maximum number of oppositions from organized associations per project is eleven (once), the minimal number is zero (registered seven times). In terms of proponent statements by associations in these 30 projects, 16 of them (0.53 on average) could be registered. The maximum of organized proponents per project is four organizations (once), the minimum zero (registered 16 times).[160]

159 A text was counted as an opposition statement if it fulfilled all of the following four conditions: First, the text must stem from an organization (i.e. an association with a charter); second, it must indicate the will to formally file objections on a concrete project; third, the text must be found on the official website/newsletter of an organization; fourth, the text must have been written and/or uploaded by a recognizable organizational board member or official spokesperson of this organization. An opposition on a project can only be counted once for each organization.

160 There is a methodological difficulty in counting proponents, because tacitness implies approval. Therefore, one can only register objections and "vocal" proponent organizations. Still, to count proponent statements it was proceeded like for the

Many opponent and proponent organizations are organized as a "federated association" meaning that they have cantonal sections and a central, overarching office that has more or less power over its sections. This is the case of the large organizations such as the WWF, Pro Natura, Patrimoine Suisse/Schweizer Heimatschutz and Paysage Libre Suisse/Freie Landschaft Schweiz. In some organizations, the central office just has coordinative tasks and leads the occasional campaign. In others, the balance of power is clearly in the center. Counting the "federated" organizations as a single one, 15 organizations that voiced opposition and ten organizations that pronounced a proponent position were registered. If each section was counted as a separate entity, 37 organizations raising oppositions and ten organizations with vocal proponent positions on concrete projects were counted. From these numbers organizations such as SuisseEole, the developer's interest representation organization, were excluded because they rarely work on concrete projects. SuisseEole rather focuses on overarching sectoral and policy development on the federal level.

The most active opponent organization by far is Paysage Libre Suisse/Freie Landschaft Schweiz. 20 of its locally active chapter organizations and the central office raised opposition statements in the present sample comprising 30 projects.[161] On the proponent side, single-purpose local associations tend to dominate (that are not visibly federated), but there are also Swiss environmental heavyweight federated organizations such as the WWF or Pro Natura that have pronounced itself in favor of one or the other project. Crucially however, these two have also raised oppositions on some other projects. Generally, proponents are more difficult to count, because tacitness has implied taking a proponent position. So this does not mean that there are fewer proponents than opponents; what is visible from this sample, however, is that opponents are much more organized. This is likely due to the fact that opposition needs planning and resources, while proponents can just vote "yes" and need not otherwise interact with the authorization procedure. The lesser degree of organization by proponents is often lamented in conversations with developers, cantonal and federal agencies, and proponent observers (interviews 3, 8, 11, 15, 18, 19).

---

opposition statements, except that, in terms of content, concrete project support needed to be written down (see footnote 159).

161 This organization — at the time of writing in March 2023 — counted 50 local chapters (Freie Landschaft Schweiz 2023b).

Regarding opposition associations and following my interview partners, opponent organizations may be divided into "principled" and "issue-based" ones (Interviews 3, 5, 8, 10). Corroborating this, the difference between "mild" and "strong" opponents in questions on WE in Switzerland has also been noted by the scientific literature (Cousse et al. 2020). This dichotomous categorization of organizations separates those with whom developers may reach compromise on certain issues from those that do not concede by principle. In interviews, some anecdotes on this point were shared: The federal spatial planning law mandates mandatory consultation of potentially affected inhabitants (based on Art. 4 RPG), which also includes the consultation of organized interests. On one hand, there have been cases of principled opposition organizations being absent in these participatory planning workshops only to later voice opposition, i.e. lamenting that they had not been consulted (Interviews 1, 3, 8, 11). On the other hand, there have also been cases where participatory inclusion was later deemed judicially insufficient (Interviews 3, 18).

Moreover, the fact that many local and single-purpose organizations have been founded for or against a WE-project is testament to a project's high degree of politicization. The focus on single-issue "local" organizations is comprehensible due to the local environmental impact of new infrastructure. However, it might also be strategic (Interview 3, 18): This might be the case because the legal eligibility of organizations to file complaints is tied to a natural or judicial person's affectedness by the potential project (see Art. 33 para. 2 RPG, Art. 89 para. 1 and 2 BGG; see section 5.2.2.). Local organizations must demonstrate the affectedness of their members (Klaber 2014, 214) in order to be eligible to file complaints, unless they have been nationally active and well-established organizations of nature and heritage protection that have been granted the associational right of appeal ("Verbandsbeschwerderecht"; see the list in the Annex VBO). Courts have interpreted this eligibility restrictively (see, e.g., BGE 1C_33/2011, BGE 1C_263/2017 and BGE 1C_677/2017). Hence, the proliferation of single-purpose local organizations might also be seen with regard to fulfilling such eligibility criteria.

In light of the strong politicization of the topic of WE in Switzerland, many interviewees have voiced concerns about the civility and earnestness of the parties involved (Interviews 1, 3, 4, 8, 9, 10, 13, 15, 18, 19, 20). This includes voices of organizations that tend to be in favor and against projects. All agree that the coarseness of language and interaction has increased over recent years. There have been anecdotes of "shouting matches" in municipal multipurpose venues before votes, intrusive canvassing by phone, neighbors that do not greet each other anymore on the street due to differing opinion, and e-mail or letters that could be considered borderline cases of libel. The politicization extends into visual modelisation with proponents and opponents claiming that each other's visualizations of the wind parks are not drawn to scale, over- or underestimating the size of the turbines and their visibility from afar. In another anecdote, a topical expert describes how everyone participating in an organizational meeting had to hand in her/his cellphone upon entering the room for fear of indiscretions. There have further been (criminal) allegations against municipal executives misusing their powers in an assembly voting procedure. There have also been unambiguous criminal actions, ranging from intimidation including anonymous death threats, defamation to arson of an electrical transformer at Saint-Brais (SRF 2016) or the slashing of tyres of a construction vehicle in Ste-Croix (Pinto 2022). To be clear, the author does not mean to imply that criminal acts are executed by organizations, as the title of this subsection could maybe imply, not at all; these acts are just mentioned as exemplary of trends in a policy field, in which experts have observed an increasing tendency of rudeness in interactions between proponents and opponents.

5.4.5. Developers

To a very large extent, but not exclusively, WE-developers are local or (supra)regional energy utility companies. In comparison to Germany, where investments are predominantly made by institutional and private investors (Helms et al. 2015), the financing of projects in Switzerland is dominated by public utility companies. 17 of the 30 sample projects are directly planned by utilities themselves or by offices working on their behalf. Most of the larger investors are publicly owned and thus tend to be partially responsible for the implementation of cantonal energy strategies: Groupe e (80% owned by the canton of FR; see Groupe e 2022), the BKW (52% owned by the canton of BE; see BKW 2022), Romande Energie (38.6% owned by the canton of VD; see Romande Energie 2022) and the SIG (55% owned by the canton of GE; see Art. 3 LSIG-GE) are the largest players. Groupe e and the SIG have their own dedicated planning subsidiaries: Greenwatt is owned by 80% (Greenwatt 2022) by Groupe e, Ennova is owned by 100% by the SIG (Ennova 2022). There are also smaller utility companies that are involved in planning WE-projects: These include, e.g., the ESB, SAK, EW

Ursern, among others. Their mostly public nature may also lead to conflictive aims between the company's aims and the public owners regarding what is profitable and what "should be done for the energy transition regardless of profitability" (Interview 13). Additionally, there are also dedicated planning agencies like, e.g., Considerate AG or Emch+Berger among others that overtake developer functions on mandate, mostly from local energy companies. A few are also independent private owners and developers with one or two people leading the effort, such as, e.g., the "Windrad ufem Chalt AG" or the "Calandawind AG". Exceptionally, there are also developers that have private equity funding, such as ADEV or Vento Ludens. Moreover, many planners form a local company together with other organizations and put the headquarters at the municipality of the WE-project's site. This is proposed as an incentive to a municipality, as it enlarges its tax base. The "Energie naturelle Mollendruz SA", for example, is the local company for the wind park of Mollendruz, and its majority shareholder is the EWZ (city of Zurich). Its minority shareholders are the siting municipalities and a city close-by, profiting from neighborhood renewable-electricity injection into the grid (see ENM SA 2022).

Importantly, there is a distinction to be made between "Promoter" and "Developer". Promoters have been active in the very early phase of WE-scouting in Switzerland but are not present anymore (Interview 3). The label of promoter refers to those companies scouting for good locations and making initial measurements. Based on these pieces of information, they then sell these pieces of information to developers. In Switzerland, SwissWinds used to partially have such a business model in the "early" days (around the year 2000) but has then transformed its business model (Interview 3). Developers, in such an understanding, are thus planners that aim to own, operate and gain from a project themselves or on behalf of a (public) mandator.

This begs the question: Why are there almost no private equity funders in Swiss WE-projects? One explanation might be that the authorization procedure is too costly and is taking too long to be an interesting business case for required margins of profit for institutional investors. In consequence, this would mean that developers of Swiss WE-projects are driven predominantly by other motivations in addition to profit. The plausibility of this is underlined by the fact that the largest developers in Switzerland are publicly owned and in constant tension between political goal attainment, following the cantonal energy strategies, and their own business cases. But at the same time it is highly unlikely that even public developers would pursue a project if it were not to reach at least minimal profitability over the medium for the long term. Hence, next to mixed motivations (political and monetary) of Swiss utilities, which are likely not present to the same extent for institutional and/or private equity investors, publicly owned companies might also be prone to higher financial risk-taking. Moreover, it might also be the case that the very high local knowledge that is required for siting procedures restricts the number of possible developers to those that are already deeply embedded in the "Swiss energy landscape". In other countries where the siting procedure might not be as long and complex, this situational (dis)advantage may play less of a role.

5.5. The role of political parties

Even though political parties in Switzerland tend to be not only weak and fragmented (Ladner 2014) but largely secondary to interest associations regarding their effects on policy-making (Arens 2020; Kriesi 1980; Fischer 2012), they should still not be neglected. Parties can (co)decide upon the evolution of policies: Regarding the topic of WE and taking the current distribution of competences into account, parties on the national level may help shape market conditions as well as framework requirements for authorization procedures. Parties on the cantonal level can formulate the more detailed rules of the authorization procedure. Cantonal legislatures may not only specify how their administrations must implement WE-authorizations, they are also in charge of regulating the cantonal utilities that are important developers of WE-projects in Switzerland (see section 5.4.5.). Cantonal legislatures may also concretize policy development with regard to WE-projects on the canton's territory that are ongoing or in sight. Moreover, partisan politicians in cantonal executives may decide about the details of assessment requirements of concrete WE-projects where they have the competences. On the level of the municipality, political parties barely develop general-abstract policy anymore; their role is to focus on assessing (predominantly executive) and adopting (mostly legislature) a concrete WE-project that concerns their municipality.

Table 5.16 shows the cantonal and municipal-level vote shares for the largest parties of the 2015 National Council elections.[162] On the cantonal level, [163] the descriptive comparison looks as follows: The only difference on the cantonal level that is statistically detectable is that the SVP is substantially less important in terms of vote share in hosts than in non-hosts. The center (CVP, GLP) and left (SP, GPS) are insignificantly larger in host cantons.

On the municipal level, the mean of 121 municipalities that host WE-projects is compared with the mean of 1'760 municipalities included in Ladner et al.'s (2021) municipal secretary survey that are non-hosts. The table shows that citizens whose municipality hosts WE-projects have elected the CVP and the GLP significantly less and the GPS significantly more. The differences are substantively small for the CVP and GLP. But nevertheless, the finding that the GLP, which recruits voters on a platform of overcoming the green-party infrastructure skepticism, is associated negatively with hosting, is surprising. However, this should not be interpreted causally: Municipalities hosting projects that started between 1998 and 2018 are included, whereas the data in this table are only a snapshot of this as they only show municipal party preferences for 2015. In terms of an overall picture of municipal vote shares, however, it seems that the political right (SVP, FDP) is distributed similarly across host and non-host municipalities, with the center being a bit less and the GPS a bit more important in host municipalities.

Comparing the partisan vote shares on the cantonal level with those on the municipal level, there are no cross-level trends that are detectable: Municipal hosts tend to have (nationally) lower preferences for center parties, whereas there is no difference for center parties between cantonal hosts and non-hosts. Municipal hosts tend to have slightly higher preferences for the GPS, but this is not the case for cantonal voters. Moreover, whereas the preference for the political right is similar across municipal hosts and non-hosts, again, this is not the case on the cantonal level. Here, citizens of host cantons vote much less for the SVP than citizens in non-host cantons. The complete incongruence of partisan preference across the electoral districts suggests

162 Vote shares of national parties in National Council 2015 elections are chosen because of different degrees of party nationalization and subsequent problems of comparability (see section 4.4.).

163 Vote shares for the National Council elections of 2015 on the cantonal level contain the mean municipal vote shares of every municipality in a canton independent of whether the municipality is a WE-host. For host cantons, logically, at least one municipality is host, for non-host cantons, only non-host municipality vote shares are aggregated and summarized in said table.

Table 5.16: Comparison between WE-hosts and non-WE-hosts: vote shares in percentages of national parties in NC elections 2015 by level of district.

Party	**WE-host mean**	**Non-WE-host mean**	**P-values**
		Cantonal vote share	
SVP	28.56	36.93	p(W): *
FDP	17.47	20.29	p(T):
CVP	20.83	13.62	p(W):
GLP	4.29	4.63	p(T):
SP	21.13	20.39	p(W):
GPS	8.41	7.26	p(W):
		Municipal vote share	
SVP	35.59	34.36	p(W):
FDP	16.05	16.38	p(W):
CVP	12.17	13.66	p(W): *
GLP	3.34	4.25	p(W): ***
SP	16.34	15.23	p(W):
GPS	7.17	6.24	p(W): *

Notes: *p<0.05; **p<0.01; ***p<0.001. All data sources are indicated in table B.

that there are different partisan dynamics at play on the two levels. In other words, the determinants of what makes a canton host are likely different than what makes a municipality decide to become a host.

Next to comparing national vote shares, the cantonal partisan distribution shall now be examined in greater detail, using data from cantonal elections and the strongly nationalized cantonal parties.[164] Substantively, looking at the relative seat shares by cantonal parties in cantonal parliaments (mean 2000–2018) in table 5.17, two cross-cantonal differences in relative seat shares of parties stand out statistically: WE-cantons have a non-substantively yet statistically significant lower mean of GLP parliamentarians[165] and a substantively and statistically significant higher mean of SP parliamentarians. This again paints a different picture of partisan strengths than the NC-elections-2015 vote shares in table 5.16: Whereas cantonal hosts tended to vote less for SVP National Councilors in 2015, the SVP did not have a significantly lower seat share in cantonal parliaments on average between 2000–2018. Both measurements agree that there is no substantive difference in the partisan center. On the aggregated left, the two measures agree that there is no overall statistically significant difference between host cantons and non-hosts. However, whereas WE-cantons have a much higher share of SP parliamentarians, cantonal citizens have voted for left National Councilors only insignificantly more in 2015. In summary, incongruence between these two measures shows that national politics and cantonal politics are likely two pairs of shoes, with different constitutive determinants. What should not be forgotten, however, is that cantonal and national parliamentary elections do not follow the same rules.

The picture of partisan membership of cantonal executives between 2000–2018, as shown in table 5.17, looks as follows: The SVP has a much higher relative seat share in non-WE-cantons. The non-hosts also have a much lower share in SP executives, but a slightly higher share in GPS executives. Cantonal executives of non-hosts have an overall “greens” seat share (GPS+GLP, following Vatter et al. 2020a) that is higher. The relative share of the years

164 For comparability within and across cantonal boundaries, the selection of parties under scrutiny was restricted to those showing a high degree of nationalization throughout the period 2000–2018, except for the GLP, as explained in detail in theory section 4.4..

165 The low number and difference is due to the mean being taken across 2000–2018, where in most cases the GLP shows a “0” — either because the party has had not yet been founded cantonally or had not reached enough votes for a cantonal seat.

Table 5.17: Cantonal partisan and party system comparison between WE-hosts and non-WE-hosts.

Party	**Coding/ theoretic range**	**WE-canton means**	**Non-WE-canton means**	**P-values**
Relative seat shares by party in cantonal parliament, mean 2000–2018				
SVP	%	19.27	21.44	p(T):
FDP	%	22.44	21.81	p(T):
CVP	%	21.23	20.97	p(T):
GLP	%	1.11	1.35	p(W): *
SP	%	19.85	14.64	p(T): **
GPS	%	5.92	5.71	p(T):
Right	%	47.2	48.08	p(W):
Center	%	24.78	24.98	p(T):
Left	%	27.31	22.69	p(T):
"Green" parties	%	7.52	8.49	p(T):
Relative seat shares by party in cantonal executive, mean 2000–2018				
SVP	%	9.85	16.89	p(W): **
FDP	%	26.07	29.39	p(T):
CVP	%	28.77	24.73	p(T):
GLP	%	0	0.25	p(W): N.A.
SP	%	21.7	15.06	p(T): *
GPS	%	3.32	4.85	p(W): *
Right	%	41.77	50.29	p(T):
Center	%	29.51	26.85	p(T):
Left	%	25.02	22.16	p(T):
"Green" parties	%	3.32	7.02	p(W): **
Share of left ct. executives in charge of the constr. dept. by year	%	16	1	p(W): *

Notes: "Ct." is an abbreviation of cantonal, "parl." stands for parliament, "exe." for executive, "p(W)" for p-value of the Wilcoxon-test, "p(T)" for p-value of the t-test. $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$. All data sources are indicated in table B.

between 2000–2018, in which a cantonal executive with left-party membership (either SP or GPS) presided over the cantonal construction department (19 years = 100%), was also measured. The mean across WE-cantons is 16% (3 years) and the mean in non-hosts is 1% (0.2 years). This difference seems large in magnitude and is also statistically significant at the five-percent level. Prima facie this would indicate that left-party executives in charge of the construction department tend to push more for WE-projects than their counterparts.

Combining the different individual findings to an overall interpretation, the following can be detected: On the municipal level, there are slightly lower CVP and GLP shares coupled with slightly larger share of GPS votes in host municipalities. Substantively speaking, however, none of these statistical differences are really meaningfully sized. For the cantonal level, three different measures were employed that cannot be easily summarized in terms of statistical significance, other than the center-parties being non-significantly differently distributed across all of them. The NC elections and the cantonal executive measure show much lower degrees of SVP shares in host cantons. Both cantonal partisan measures show a larger share for the SP in host cantons. However, if one is allowed to interpret differences beyond their statistical significance — the measures contain the full population of cantons and there is therefore no uncertainty due to sampling — one can detect descriptive similarities: In host cantons, the SVP and GLP are consistently lower, while the CVP and SP are consistently higher. For the FDP and the GPS, descriptive findings are mixed. Overall, on the cantonal level the left and the center are slightly stronger, whereas the right is less strong. But this is an average tendency, not a "hard" fact.[166]

5.6. Positions and relations within wind energy project arrangements

In this section, the aggregate and mean Swiss WE-project authorization networks are described, and the findings are embedded in the existing literature. These networks consist of all organizations involved in implementation of WE-project authorizations and their relations (as described in section 5.4.), except for the political parties that are not considered to be part of the implementation arrangement. Statements and illustrations are based on the

166 Based on proportionality of election systems data by Vatter et al. (2020a), election systems do not differ between the two groups on the cantonal level.

30 WE-project sample from the NCS (see section 6.1.). The ties that link the various organizations take on four different meanings that are referred to as "themes": They model the intensity of general collaboration, the intensity of collaboration above-legal-minima (ALM), the intensity of agreement-conflict and of trust-mistrust. In what follows, aggregate relations are shown and described first. Thereafter, a description of the three analytical categories as given by the ACI (meaning actor constellations, modes of interaction and actor orientations) is presented. The findings are subsequently embedded in the literature.

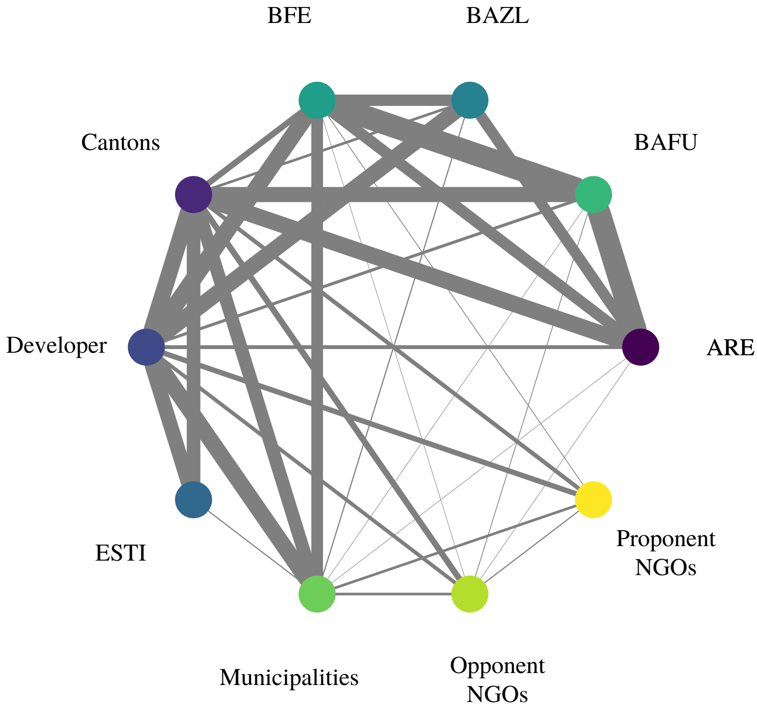
5.6.1. Aggregate network graphs by stakeholder and theme

In this subsection, graphs of the relations between organizations in implementation arrangements are shown.[167] What is shown are the summed (and equally weighted) relations between two categories of stakeholders for all projects combined. Non-project-specific organizations, i.e. actors that are active in the field but not on specific projects, such as Swissgrid, the interest organization SuisseEole or political parties, are not included. The thickness of the depicted ties indicates the sum of the number of relations between organizations in these 30 projects. This set-up is the same across all four network themes.

The general collaboration picture depicted in figure 5.4, shows strong collaboration activities between public organizations of all levels and with the developer. Especially notable is the collaboration between agencies on the federal level BFE, BAZL, BAFU, ARE, ESTI. Rather weak are the intrapublic ties between municipalities and the ESTI, or between the cantons and the BFE. Given that developers are the applicants to the permits, they are especially well-connected, except notably, with the ARE and the proponent and opponent NGOs. The weak collaborative tie with proponent NGOs is unexpected: However, this is due to the fact that there are not many of them. More generally, proponent NGOs are not well-connected collaboratively. On the opposite side of interests, NGO opponents are non-involved collaboratively. This might either have to do with an unwillingness to engage borne

167 The graphs used the binary mode and "pre-given list" form of generated networks (see table 6.1 for explanations). To generate the graphs, stakeholders from categories that are not shown in the graphs were removed, all ties were weighted equally (weight = 1) and ties between the same two categories of actors were summed.

Figure 5.4: Fully aggregated general collaboration network, by implementation arrangement stakeholder category.



out of (fundamental) opposition, as some interviewees suggested (Interviews 8, 9, 10, 20) but it might also be the case that the current best practices of more extensive stakeholder management have not been applied for a long time.

The second network graph in figure 5.5 shows voluntary collaboration initiatives, meaning those that go beyond the minimally necessary legal requirements (ALM). If I compare the two collaboration graphs, what meets the eye first is the general "lightweight" of the collaboration structure beyond-legal-minima. This largely confirms that the intensity of voluntary collaboration is much less than of general collaboration, the marked difference and main source of collaboration thus being the requirements of the legal procedure. A second conspicuity is the relatively strong voluntary collaboration among the federal offices. Best practices sharing, working groups and similar initiatives thus stem from the realm of the federal coordination effort. The central position for voluntary collaboration remains with the "guichet unique" that is attached to the BFE. A little less strong but still existing in the overall network is the cross-level public collaboration between the BAFU, being in charge of many tasks concerned with WE-impact assessments, with cantons. Interestingly, however, the federal agencies are not in strong contact with municipalities. But this confirms that it is the cantons who are directly in charge of overseeing their municipalities' doings. In addition, the thinness of the lines to and from the developers, despite their central position in the implementation arrangement, illustrates the strong collaboration-shaping power of legal requirements. Opponent NGOs are rarely in voluntary contact with others. They are not in contact at all with proponent NGOs. In the interviews, such NGO opponent contacts with organizations from other stakeholder-categories were pure information exchanges: Given the neutral arbiter role of the federal offices with regards to projects they evaluate, it is not possible there being substantive collaboration, only the sharing of publicly available information (Interviews 12 and 14). As in the general collaboration network, proponent NGOs are not well-connected collaboratively. As mentioned for the general collaboration graph, the likely cause of this is that there are simply not many of them.

A quick glance at the conflict[168] implementation arrangement leaves no doubt about the sources of conflict in the authorization procedure. The various

168 For the purpose of this conflict representation, agreement relations in the agreement-conflict network were coded as an absence of relation.

Figure 5.5: Fully aggregated above-legal-minima-collaboration network, by implementation arrangement stakeholder category.

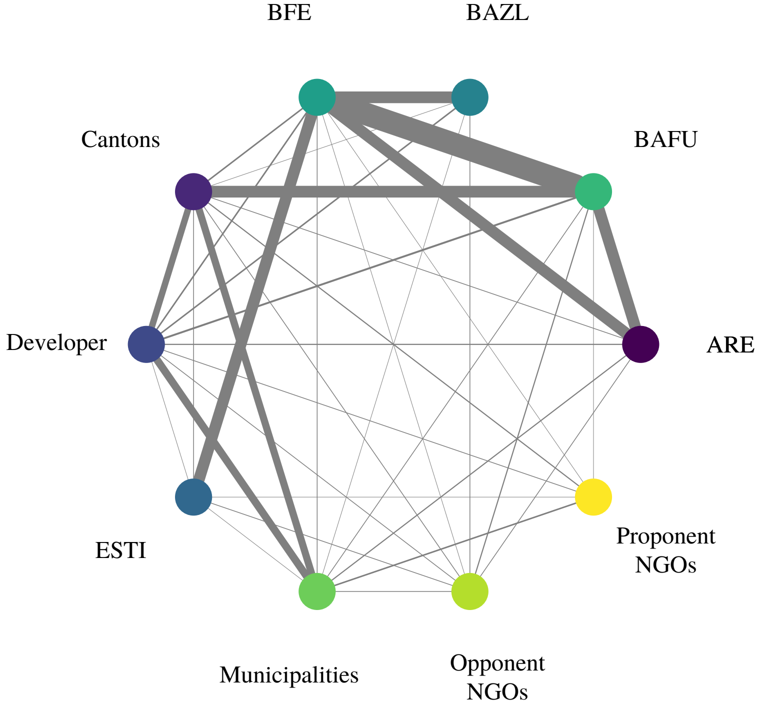
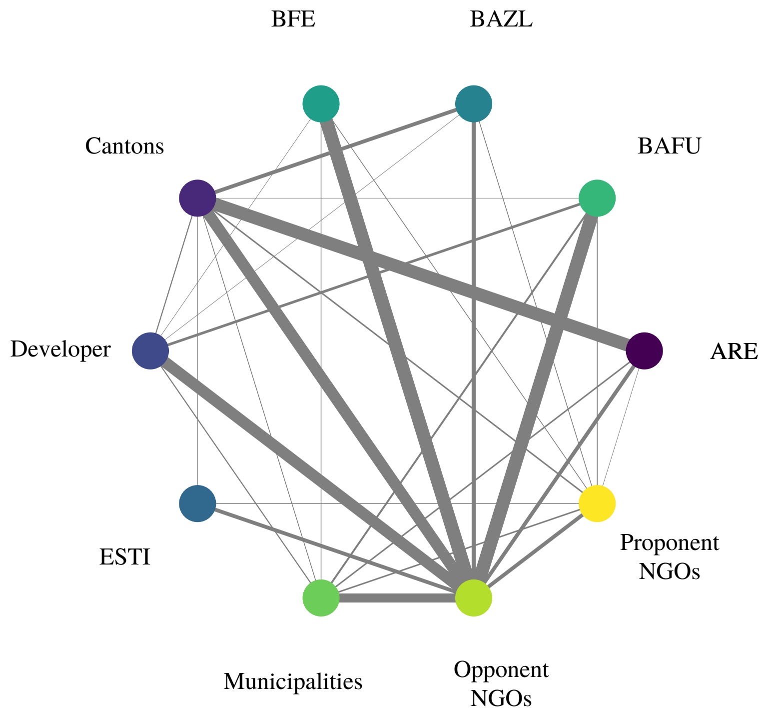


Figure 5.6: Fully aggregated conflict network, by implementation arrangement stakeholder category.



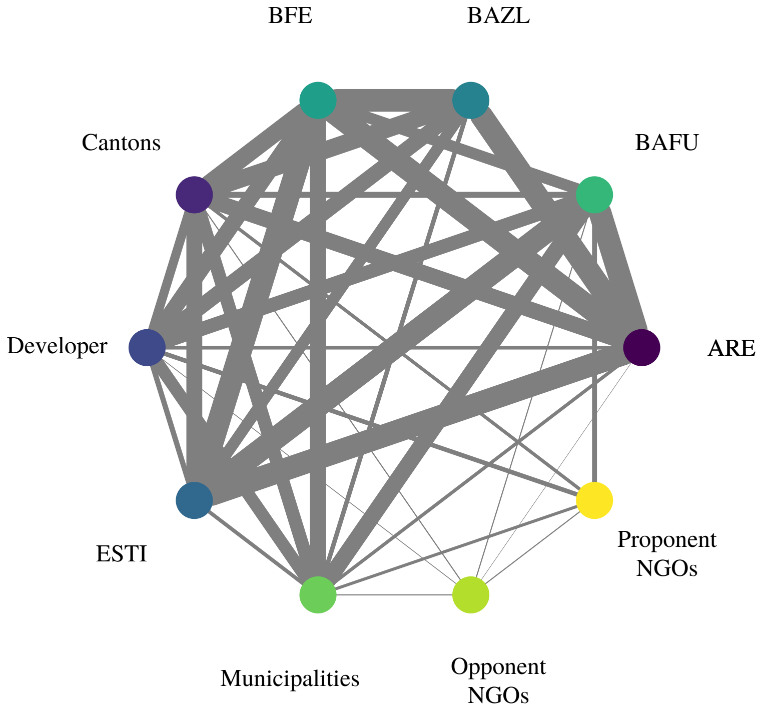
public actors and the developers all stand in conflict with opponent NGOs but are only rarely in conflict with each other. The graph further illustrates that the authorization procedure leaves little room for conflict between organizations in charge of evaluating projects and developers, even though it is the developer's project that is profoundly assessed and the developer-public relations would therefore provide major points of friction. It seems as though developers face clear indications on how to enter projects and documents (as seen in the absence of venue-shopping or strategic posturing by developers in section 5.6.2.). The only other notable conflict that is not with opponent NGOs is between cantons and the ARE. This is explainable in terms of legal procedure, as the ARE is in charge of validating the CSP and thus may deny or downgrade cantonal plannings. Even though cantons might regard their plans as sufficiently incorporating federal interests or estimate their planning to be well-within the bounds of their own competences, this provides friction (see section 5.4.3.). Hence, generally speaking, conflict is — and this is important — *barely* an intra-public or administrative phenomenon; it is, after all, mostly a phenomenon of the interaction between opponent NGOs and public actors or developers.

The last implementation arrangement graph summing the relations of the 30 sample projects is on the theme of trust.[169] What first meets the eye when inspecting this graph depicted in figure 5.7 is that trust seems to present the inverse picture of the conflict network. NGO opponents receive by far the least amount of trust of all stakeholders. Given the heated political climate between proponents and opponents, the generally favorable orientation of municipality and cantonal governments, and the neutral role of public project evaluators, this is to be expected. Importantly, trust, as understood in the survey, means not closing one's eyes and tolerating everything a trusted partner does. Rather, trust denotes a "good working relationship", in which one has not been deceived about the quality of past contacts or collaborations.[170] Astonishingly, although there is conflict between the cantons and the ARE, there is also trust, which relativizes the saliency of the previously detected intra-public ARE-canton discord.

169 Like for the agreement-trust network, mistrust relations in the trust-mistrust network were coded as an absence of relation.

170 In case respondents had not been in contact in the past with each other, which was rare, respondents were asked to indicate their trust based on the quality of the work relationship they expected to have in a WE-project, e.g. from interactions on other projects or from more general interactions.

Figure 5.7: Fully aggregated trust network, by implementation arrangement stakeholder category.



The relations between developers and cantons and also between developers and the ESTI seem strained in comparison to the other developer lines of thick lines of trust. With the ESTI, as a technical organization, although given the absence of conflict, it can be expected that the absence of high trust is due to the fact that they are not in contact frequently throughout the project and thus tend to rate their working relationship as neutral. The explanation for the relative thinness of the developer-canton trust relation likely has to do with the wide divergence of canton-developer relations across projects. Moreover, the high amounts of trust that stand in almost all relations of municipalities should be further underlined. As their landmark characteristic, political municipalities in Switzerland sport widely varying degrees of professionalization in terms of time and financial resources (Freitag et al. 2019, ch. 2 and 5; Vatter 2020, 442). The fact that municipalities have good working relationships with all public organizations would not suggest concurrent problems of resources and overburdening associated with them (as found descriptively in section 5.4.2.).

5.6.2. Relations in the average wind energy project network

Instead of describing *summed* relations as in the preceding section using graphs, the present section is concerned with describing the characteristics of the *mean* WE-implementation arrangement. The purpose of the present section is twofold: First, the mapping function of the present chapter mandates the description of how organizations deal with each other on average in Switzerland. Second, mean relations may serve as a benchmark for expert readers that wish to confront their estimation of such characteristics in projects in which they are involved to the mean network. To capture the important characteristics that have been known to produce value in implementation arrangements, a description following the three main analytical categories of Scharpf and Mayntz' actor-centered institutionalism is resorted to.

Actor constellation metrics

Following the conceptualization in section 2.2.2., an illustration of actor constellations requires a "mapping" by network metrics. This, in turn, requires knowledge about the topography of the networks and the capabilities of

Table 5.18: Actor constellation metrics in the mean project-implementation arrangement.

Metric	**Coding, theoretic range**	**Min.**	**Max.**	**Mean**	**SD**
No. of organizations	Count	11	28	18.32	5.17
No. of veto organizations	Count	3	17	8.02	3.77
Index of reputational power	Index, see fn. 172	0.66	15.27	7.94	5.14
Mean *proponent* coalition reputational power	Index, see fn. 172	5.37	9.25	8.11	1.01
Mean *opponent* coalition reputational power	Index, see fn. 172	2.99	9.40	6.03	1.86
Difference in reputational power between proponent and opponent coalitions	Proponent coalition index scores−opponent scores	-4.03	5.70	2.08	2.34
Substantive power of agency granting the construction permit within implementation arrangement	Ord., -2–2	-2	2	0.08	1.36
Discretionary power of public organizations, est. by public organizations	Ord., 0–3	0	3	1.30	0.82
Discretionary power of municipalities, est. by developers	Ord., 0–3	1	3	2.12	0.86
Discretionary power of cantons, est. by developers	Ord., 0–3	1	3	2.45	0.67
Discretionary power of federal offices, est. by developers	Ord., 0–3	0	3	2.24	0.90
Mean agreement-conflict intensity in project-network	Ord., -2–2	-0.15	0.82	0.40	0.28
Mean trust-mistrust intensity in project-network	Ord., -2–2	-0.1	1.11	0.45	0.29

Source: NCS, see section 6.1.

involved players. In consequence, the study has proposed to measure actor constellations as the size of networks, meaning the number of participating organizations, the participants' reputational power, their discretionary powers, and (relative) conflict and trust between the involved actors. Table 5.18 presents the data of these metrics.

A crucial characteristic of actor constellations is the size of the implementation arrangement: The number of organizations involved in a mean wind energy project in Switzerland is high, with 18 organizations on average (range: 11–28 organizations) but with a very large standard deviation of 5, indicating high fluctuation between projects. Organizations that have the legal power to cancel a project were counted as veto organizations. In practice, this has amounted to counting the number of organizations of the municipality, canton, developer and opponent NGO categories as veto players.[171] In the 30 sample projects, there are anywhere between three and 17 veto players involved, with eight being the mean (SD 4).

In addition to network size and veto players, actor constellations are frequently described through configurations of relative power in a network. To measure this, the "reputational power" approach (see Dahl 1961), which has been widely used in the literature since the 1960's to measure the influence of individual organizations (Fischer and Sciarini 2015, 61), is followed. Following this approach, respondent experts were asked to name the most influential organizations (at least five) in the implementation arrangement of the project in which their organization was involved in. The scores derived refer to the weighted (and meaned) number of times an organization was mentioned as influential by another organization from the same WE-project. The resulting index was further corrected for the varying number of respondent organizations per project arrangement.[172]

171 Importantly, offices of the federal administration have not formally opposed projects in the past and are therefore not considered to be veto players. Rather, their points of critique have so far mostly been added to increase the "approvability" of a project with the relevant federal legislation that they need to check.

172 Based on the two types of project implementation arrangements, either based on organization names or summarized to stakeholder categories, this has resulted in two different measures of reputational power: the "organization names" or the "category" index. Only the latter is reported, although the former has always been tested as well. Both indices exist as scores based on organizations naming at least five other influential organizations. For the categories index, only nominations of organizations from the categories of developers, municipalities, cantons and opponent NGOs were counted. The construction of the category index followed five steps: I first counted how many times each of these four source categories nominated a target category,

The category-index of reputational power (henceforth named the "index of reputational power") contains a mean of 7.94 that is close to being half of the range (0.66 to 15.27), indicating an equally dispersed distribution of reputational power scores smaller and larger. But its large SD of 5.14 shows that reputational power is widely dispersed between the categories of stakeholders. Combining reputational power scores across opponent and proponent actor orientations, one can calculate the average proponent and opponent coalition reputational power. The mean proponent coalition reputational power in WE-project implementation arrangements is 8.11 index points (range: 5.37–9.25), compared to the average opponent coalition reputational power that is on average 6.03 points strong (range: 2.99–9.4). The range across projects with opponent coalitions is larger than with proponent coalitions. This, along with the larger SD of the opponent coalition, gives an indication that the opponent coalition's average reputational power varies more strongly than the proponent coalition's. The data further show that opponent coalitions can also be slightly more powerful in projects than proponent coalitions (9.40 vs. 9.25 index points).

---

resulting in four numbers per target category (e.g. number of nominations of category "proponent NGOs" by developers, by municipalities, by cantons, by opponent NGOs; number of nominations of category "ESTI" by developers, by municipalities...). A second step consisted in correcting for these four main categories' relative weight: Developers gave 128 nominations in total, municipalities 151, cantons 113 and opponent NGOs 90. In a third step, the number of times a target category was mentioned (from the first step) was then divided by this category's weight (from the second step) and multiplied by 100. As a fourth step, the index was created as the sum of the four resulting numbers from step three. As a fifth and last step, the mean was taken of the nominated category index scores. In contrast, the construction of the "organization names" index of influence followed a different procedure: First, I counted how many times this organization was mentioned as influential by other organizations from the same project. Second, I counted the number of participating organizations that have responded per project, ranging from 1–8. In a third step, I used the category-index weights, where I made the choice to set the canton's value of 15.27 points to 90%. This number was chosen because I received responses from approximately 90% of the project cantons that were in the sample. The other weights were derived as proportional to the 15.27 points representing 90%, then rounded to the next 5%. In a fourth step, the index was created as follows: Number of received nominations in a project + (8 – (number of respondent organizations in the project) × weight). The two operationalizations of reputational power do not differ greatly in terms of their regression results, and I will therefore only concentrate on the category-index.

Thus, the coalition picture of reputational power balance remains mixed, with a slight edge of influence on average for proponents. But as the public actors included (cantons and municipalities) are powerful and tend to be passive proponents in existing WE-projects, this skew is not surprising. Crucially, the proponent coalition should not be understood as consisting only of developers; the opponent coalition, however, almost exclusively consist of NGOs and civil society actors, together with some municipalities. The point is that the comparison between proponent and opponent coalition influence does not boil down to a comparison between developers versus NGOs and cannot be interpreted as such. Put differently, NGO opponents can be as powerful as developers, cantons and municipalities together.

If one examines the differences in mean reputational power between the two coalitions, one finds a mean distance of 2.08 points, skewed in favor of the proponents. This shows that there is little power divergence between coalitions on average, but it also demonstrates that proponent coalitions tend to be slightly more powerful in the project, as the range from -4.03 to 5.7 is slightly skewed to the positive (proponent scores). However, the SD of 2.34 is larger than the skew, hence the skew should not be interpreted as large or highly significant. Rather, the slight skew is likely due to the more frequently found pro-WE orientations of the public actors, such as cantons or project-driving municipalities.

An additional question asked respondents whether they accorded much substantive power to the agency that concretely grants the authorization decision. This substantive power denotes whether the agency simply executes a decision pre-made by others (-2) or whether this agency always strongly determines the content of the decision (+2). The data from the NCS show that the substantive power of the agency granting the permits is neutral on average. The measure also shows a large standard deviation of 1.86 points. Hence, the actual authorization agencies have widely different roles in their respective project implementation arrangements, without descriptive conspicuities to one or the other extreme.

Respondents were further asked to estimate the extent of public discretionary powers. On a scale from 0 (inexistent) to 3 (large), respondents could indicate the extent of how they perceived discretionary powers of themselves and of others. The results are the following: On one hand, public organizations view themselves as not having much leeway, being bound by the formality as defined by laws and substantiated by ordinances and decrees (mean: 1.3, SD: 0.82). But on the other hand, developers attribute greater leeway to public agencies. Developers see cantons as having comparatively much discretion in decision-making (mean: 2.45, SD: 0.67), followed by the federal agencies (mean: 2.24, SD: 0.9). Developers also estimate that municipalities have some discretionary power, but the least of all three levels of government (mean: 2.12, SD: 0.86). It is argued that the difference in self- vs. external perceptions of discretionary power illustrates the different set of value orientations in developer versus public work: Whereas public agencies are presumably rather process-oriented in their work, pursuing the democratic governance goals of equity and legitimacy in their assessment work (see Bogason and Musso 2006), developers are likely to be more goal-oriented (getting their wind turbine built).

Mapping actor constellation means showing relative power positions, but, importantly, it also means depicting relative conflict and trust. The mean intensity of the agreement-conflict relation stands at a value of 0.4 (-2: fully disagree; 2: fully agree) and thus slightly on the positive side. The SD of 0.28 is relatively large, but the neutral point of zero is 1.42 SD away. In the trust-mistrust network (-2: full mistrust; 2: full trust), the average relation is almost the same, at 0.45 (SD 0.29), slightly on the trustful side of the neutral zero. Again, the relatively larger standard deviations show that these values diverge strongly across the project networks. On average, trust and agreement overshadow conflict and mistrust in total, with the following observed range: The most conflictual network has a mean score (mean of all values of all organizations within a WE-project) of -0.15, the most agreeable one is at 0.82 points. The most trustful implementation arrangement is at a positive score of 1.11 and the most mistrustful one is at -0.1. Mean trust in an implementation arrangement is similarly high as mean agreement.

Modes of interaction metrics

In contrast to actor constellations, modes of interaction put the spotlight on characteristics of the extensiveness of collaboration and the collaborative embedment of its actors (see section 2.2.3. for the corresponding theory). To measure such aspects of collaboration, various collaboration items were included in the NCS that is based on the sample of 30 WE-projects. These are: the connectedness (degree, density and betweenness; see glossary in the online appendix) as well as the intensity of collaboration, the formality of the interaction, the possibilities of venue shopping and the preponderance of negotiations or hierarchical decisions. Table 5.19 presents the data in detail.

Table 5.19: Mode of interaction metrics in the mean project-implementation arrangement.

Metric	Coding/ theoretic range	Min.	Max.	Mean	SD
Mean degree of implementation arrangements	Count	10.83	18.15	11.06	1.52
Developer degree*	Count	6**	13**	11.02	2.17
Municipality degree*	Count	6**	13**	10.79	1.88
Canton degree*	Count	6**	13**	11.41	1.36
NGO opponent degree*	Count	0	20	12.26	6.37
Density	Cont., 0–1	0.15	0.37	0.25	0.06
Mean betweenness	Cont., 0–1	0.04	0.09	0.06	0.02
Developer betweenness*	Cont., 0–1	0	0.36	0.11	0.11
Municipality betweenness*	Cont., 0–1	0	0.55	0.15	0.16
Canton betweenness*	Cont., 0–1	0	0.43	0.18	0.12
NGO opponent betweenness*	Cont., 0–1	0	0.63	0.17	0.19
Coordination formality with (other) federal agencies	Ord., 0–3	1.82	2.57	2.21	0.97
Coordination formality with (other) cantonal agencies	Ord., 0–3	1.57	2.33	2.00	0.92
Coordination formality with (other) municipalities	Ord., 0–3	0.83	1.44	1.14	1.21
Prevalence of negotiations in cross-gov.-level collaboration	Ord., -2–2	0	0.86	0.5	1.06
Prevalence of negotiations in within-cantonal collaboration	Ord., -2–2	0	2	1.29	0.61
Perceived degree of shared competences between gov. levels	Ord., 0–3	1.42	2.14	1.86	0.82
Unambiguousness of submissions for developers	Ord., -2–2	-1	2	0.73	0.72

Notes: * In these networks, sender and receiver organizations are of the four categories of stakeholders listed. ** The fact that the three stakeholder categories have the same range can be explained by the fact that the networks used to apply the metric contain only actors of the four main categories (see *). Source: NCS, see section 6.1.

The degree in a network counts the number of relations as a measure of how embedded an organization is within other organizations. In the mean WE-implementation arrangement, an organization is connected collaboratively to eleven other organizations in such implementation arrangements. If one is to look at the degrees of the four main categories of stakeholders (developers, municipalities, cantons and opponent NGOs), one can see that they are similarly often collaboratively connected with each other (between eleven and twelve connections on average). What is conspicuous, however, is the large SD of the opponent NGO degree (6.37 ties), indicating that their collaboration varies strongly across projects. This can also be seen in the wide range of values that their degree to other actors take. In view of the graphic finding that opponent NGOs are not well connected between the different categories of actors (see section 5.6.1.), their high connectedness must necessarily stem mostly from within-category collaborations.

In terms of the stakeholders' betweenness, neither of these four categories are conspicuous bridge-builders (betweenness; see glossary in the online appendix) regarding general collaboration. The measure of mean betweenness centrality that incorporates all organizations of all stakeholder categories shows that bridge-building is on average very rare. This means that there no or very few actors that amass a larger number of shortest connections between other organizations. Yet what is surprising is that, again, opponent NGOs have the largest range of betweenness scores. Although the mean is low compared to the middle of the range, opponent NGOs may act as significant bridges, but very likely this bridging capacity stays *within* the category of opponent NGOs.

Respondents of public organizations were further asked whether they coordinated their activities with other public organizations rather formally or informally. With formality, the survey denoted to which extent respondents could "just call or write an e-mail" on the informal extreme or "meet only via institutionalized channels of collaboration" on the formal extreme. Respondents indicated that their interactions are more of a formal than informal kind with and between federal offices, but also with and between cantonal agencies. Only when coordinating with municipalities do public organizations have a lower degree of formality on average, but also the largest variation among the coordination formality in and across the three levels of government. Hence, formality in coordination dominates on and with the cantonal and the federal level, which is less the case for coordination with or within the municipal level. Regarding the prevalence of negotiations in cross-level collaboration, public organizations responded that, on average, a negotiation solution and a hierarchical decision imposition are about equally frequent, with a tilt towards more negotiations, but with a considerable SD. In within-cantonal collaboration, cantonal respondents found it almost always the case that negotiations happen, with a comparably small SD. In other words, it was observed that hierarchical "dictation" does not happen in a substantively important way within cantons.

Venue-shopping in multi-level politics has further been a frequently debated issue (see theory section 4.1.). In the case of WE-authorization procedures in Switzerland, the three-level government structure, which shares responsibilities and legal competences to produce a final authorization decision, has been theorized to possibly provide such an opportunity structure that induces strategic behavior for developers, proponents and opponents. This seemed theoretically likely, even more so because the topic has been highly politically salient since the acceptance of the energy strategy 2050 in May 2017 (BBl 2017 4865) and the cancellation of the planned electricity agreement between the European Union and Switzerland in 2021 (Haffner 2021). However, as actor constellation metrics showed low margins of discretion and the procedure is defined in detail, it could also be unlikely. The study chose to measure this possible strategic behavior indirectly, by asking respondents on their perception of the degree of shared competences and by asking developers whether their submission and coordination channels were unequivocally prescribed. The results show that some competences in WE-authorization procedures are shared between the government levels. This is evidence to suggest that there is at least the possibility for venue-shopping. However, developers were further asked whether the addressee of their documents was ambiguous. Their answers show that it is mostly to fully unequivocal where to submit a request, an assessment, etc. These findings suggest that there is not much ongoing venue-shopping despite the possibility for it. However, the rough granularity of this evidence does not disprove that it might be an issue in the odd case.

Actor orientations metrics

"Actors" contain two analytical dimensions: their capabilities and their orientations. As the capacities of actors have already been presented in section 5.4., the present section focuses on actor orientations, an actor's second dimension of analysis in the ACI. To measure them, respondents were asked to indicate preferences for or against WE-projects. The measures distinguish between core orientations and secondary orientations.[173] A preference for wind energy has been recoded from a scale of agreement from -2 (strong opponent opinion) to 2 (strong proponent opinion). Subsequently, orientation scores were divided up into two coalitions, one of opponents (negative scores) and one of proponents (positive scores). Using these orientation scores, three factors of orientations were estimated: A "full" factor containing all orientation items, a "core" factor that includes only "core" policy-orientation items and a "secondary" factor that only contains secondary items.[174]

Table 5.20 summarizes these metrics. The full factor of actor orientations that combines core and secondary orientation items is negatively skewed. This indicates that anti-WE respondent orientations are more dispersed than are orientations favoring WE in Switzerland. Like the full factor, the core factor shares this negative skew as well, but it is smaller. In contrast, the secondary factor shows an inverse, right-skewed dispersion. For secondary orientations, it is the proponents that are more dispersed in their orientations.

The aggregation of orientations has permitted the building of the metric of mean coalition orientations, which is a metric that describes the mean position of proponents and of opponents in a project, using the full factor

173 This is similar to the ACF's "core" and "secondary beliefs" (see Sabatier and Weible 2007). The "core" factor combines opinion items capturing "fundamental assumptions and worldviews", which are "[...] hard to change" (Markard et al. 2016, 7), and items covering so-called "policy-core beliefs", which represent "[...] applications of deep core beliefs that span an entire policy subsystem" (Sabatier 2007, 194). In the present study, the subsystem is given by WE-authorization procedures in Switzerland. Core beliefs are what comes closest to Scharpf's idea of actor orientations that scholars have interpreted as "the guiding philosophy of actors which affects their choices and modes of interaction" (Lorenz 2011, 410). Secondary beliefs, in turn, do not range across an entire subsystem and address particularities (see Sabatier 2007), e.g. the belief whether a wind turbine can be completely dismantled without long-term consequences for the environment.

174 Importantly, the full factor of orientations is not a linear combination of the core and the secondary factor, all three factors have been independently estimated with exploratory factor analysis with 95 independent observations. These three factors were modeled using the package *efatools* (Steiner and Grieder 2020), inputting all, core or secondary orientation items. In all three cases, the empirical Kaiser criterion (EKC; Braeken and van Assen 2016) was relied upon to extract the correct number of factors. In all three cases, a single and therefore unrotated factor was extracted. Factor scores were then calculated with the Thurstone-method (Thurstone 1934). All factor loadings are available in table C in the online appendix.

Table 5.20: Actor orientation metrics in the mean project-implementation arrangement.

Metric	Min.	Max.	Mean	SD
Full orientations factor	-2.33	0.96	0	1
Core orientations factor	-1.81	1.18	0	1
Secondary orientations factor	-0.94	2.17	0	1
Mean proponent coalition orientations	0.25	0.64	0.48	0.09
Mean opponent coalition orientations	-1.02	-0.41	-0.68	0.21
Difference in coalitions' orientations	0.76	1.57	1.16	0.23

Notes: Data are z-scores. Source: NCS, see section 6.1.

scores.[175] These coalition orientation scores show that proponents are on average less positive than opponents are negative about the mean WE-project. The average opponent belief position is more variedly negative, however. Examining their difference, the mean proponent and opponent coalitions stand 1.16 z-scores from each other. The small SD indicates that the differences in average orientations between proponents and opponents is stable.

5.6.3. Embedding the case of Swiss wind energy implementation arrangements in the literature

The question arises to what extent the described arrangements can be regarded as typical for Swiss policy implementation. The findings unfortunately cannot be embedded one-on-one because of the lack of literature on Swiss implementation arrangements in energy and/or environmental policy that have been formally modeled as networks. Moreover, the amount of detail that was presented as descriptive evidence for WE-implementation arrangements does not allow for a comparison by detailed measure. Hence, the present

175 The mean orientation score of all involved organizations that have a positive orientation score and are involved in a project equals the average proponent coalition belief score for that project. Inversely, the mean orientation score of all organizations that have a zero or negative orientation score results in the average opponent coalition belief score for this project.

study's network description can only be embedded in broader terms and within overlapping but not coincidental literature on either topic or method. Its closest relative is Kriesi and Jegen's (2001) study on organizational networks in Swiss energy policy (not implementation-specific), who discovered a pro-growth and a pro-ecology coalition of comparable power and size that is reproduced on a smaller scale in energy policy questions on the cantonal level. In climate policy (not implementation), Ingold (2011) and Markard et al. (2016) also found two opposing coalitions, which they labelled as the "pro economy" and "pro ecology" camps.

In WE-implementation arrangements in Switzerland, the basic distinction into two opposing coalitions (WE-proponents and WE-opponents) can also be made, even though it cannot be argued that either one is more "pro-ecology" or "pro-economy", as both camps claim to act on behalf of the imperative of climate change and ecology more generally. In WE-implementation arrangements, the strong divide in trust, conflict and collaboration manifests itself between NGO opponents and a combined group of developers and public authorities (in the average and most frequent case). Blake et al. (2020) corroborate the existence of a normally low number of coalitions in two Swiss WE-projects also qualitatively: Using expert interviews, they found that in their two cases 2–3 opposing coalitions could be detected in each project. Interestingly, and in opposition to the findings here, they found that not all cantonal agencies could be found in a proponent coalition. While this is overall likely to be the case in the odd project, it is argued here that this is likely to be an exception, because in the 30 surveyed implementation arrangements large scale cantonal equivocalities could not be detected.

Kriesi and Jegen (2001) also found that the two energy policy coalitions were similarly powerful, which can also be maintained for WE-projects in view of the presented results on reputational power, even though the proponent coalition tends to be slightly more powerful on average. This is due to most public authorities being part of the proponent coalition. Blake et al. (2020) have associated more balanced coalitions with a lower success rate in their case studies on WE-projects (see also Fischer 2015b), but this cannot be confirmed for the present sample of 30 WE-projects. Kriesi and Jegen (2001) further found that in their energy policy network representatives from the "electrical industry" and from cantonal administrations (governments) tended to be interest-aligned. That in the average case developers and cantons are in the same proponent coalition can also be corroborated for the surveyed WE-implementation arrangements.

Concerning the null-finding of bridging actors in the mean and full WE-implementation arrangement ("betweenness"), previous studies on related policies came to different conclusions: In Swiss energy policy at the turn of the century, cantons appeared to be brokers between opposing coalitions (Kriesi and Jegen 2001). Ingold (2011) as well as Markard et al. (2016) also found cantons but also moderate parties and federal agencies to be brokers in Swiss climate policy. Braunschweiger (2022) also found federal agencies to act as bridge builders. In contrast, in WE-implementation arrangements brokers are decidedly absent, pointing to a high conflictuality of the subject matter.

Regarding collaboration, relatively strong intrapublic cross- and within-level, as well as public-developer relations could be detected. Voluntary collaboration (above legal minima) appeared much "lighter" but did not appear to have a different pattern. The finding of relatively strong vertical collaboration stands in contrast to Braunschweiger's (ibid.) and Sager et al.'s (2003) results of Swiss federal agencies not building ties across levels of government in other studies on Swiss governance/implementation arrangements.[176] However, the relation between legally determined and voluntary (above-legal-minima) collaboration can be said to be more closely aligned with previous research. Wittwer et al.'s (2022) regional policy implementation study also found that voluntary collaboration had been strongly institutionally determined: As found in WE-implementation arrangements, most collaboration is legally mandated, with voluntary collaboration only showing minor amplitudes, following a very similar pattern as the general collaboration. On the question of whether collaboration arrangement formation is dominated by policy field or institutions, the result of the present study remains equivocal but similar to the findings by Sager et al.'s (2001) study on implementing the 28-ton limit for trucks: On one hand, the regular political institutions in Swiss federalism, especially the executive bodies of Swiss federalism, play an crucial role. On the other hand, highly specialized and policy-field specific agencies as well as civil society actors that are less likely to be institutionally determined are also crucial in WE-implementation arrangements.

176 Braunschweiger (2022) investigated governance arrangements in Swiss climate adaptation policy, Sager et al. (2003) scrutinized implementation arrangements in Swiss alcohol prevention policy.

Chapter 6: Link 1: Decentralization effects on implementation arrangements

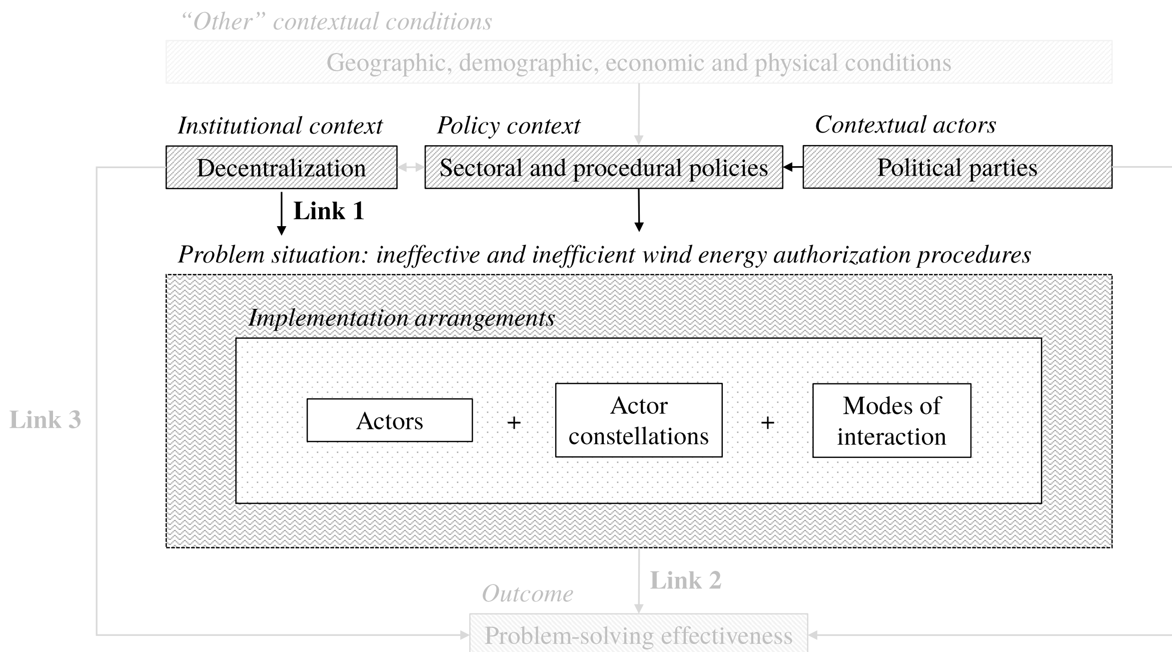
This chapter investigates the role and effects of decentralization within and between cantons on aspects of implementation arrangements dealing with Swiss WE-authorization procedures. With regard to the overall analytical model of this study (see figure 2.2 in section 2.4.4.), the focus of this chapter lies on the first analytical link between decentralization and implementation arrangements, as indicated in figure 6.1. Furthermore, effects of political parties as contextual actors on implementation arrangements will also be reported. In accordance with the conceptualization in the theory section 3.2., implementation arrangements are understood as organizational networks. Overall, the chapter seeks to answer the first part of the research question asking how decentralization affects implementation arrangements.

The chapter proceeds as follows: After a methods and data section (6.1.), which explains the NCS and the modeling procedure, the chapter takes Mueller's (2015) dimensions of cantonal decentralization as a guiding rail: In section 6.2. the independent variable of decentralization is presented in cantonal comparison. Thereafter, in section 6.3., the analytical part of the chapter begins. Decentralization effects on implementation arrangements are modeled using linear regressions, mediation models and exponential random graph models (ERGMs), followed by a summary of decentralization effects. Subsequently, the study checks for effects of partisan variables on implementation arrangements, using the same methods as had already been applied to decentralization (section 6.4.).

6.1. Methods and data

In this section, the Network Characteristics Survey (NCS) shall be presented first. Thereafter, an account of the modeling procedure of networks and of significance and robustness thresholds shall be delivered.

Figure 6.1: Chapter 6 focus in the present study's analytical model.



Notes: Analytical categories indicated by rectangular boxes with different shading per category, labels in italics, material content in regular font, links of correlational association in bold font; grayed out is what is out of focus in this chapter.

6.1.1. The Network Characteristics Survey (NCS)

The link under scrutiny in this chapter has been investigated primarily based on an original survey that was labelled as "Network Characteristics Survey" (NCS). It was conducted between September 2020 and April 2021. The response rate was at 54.5%,[177] with 97 fully and 13 partially filled-in questionnaires. The acceptable but relatively low response rate is not surprising given the high political entrenchment surrounding the topic of WE in Switzerland. The sample contains 30 WE-projects of the population of "standard"- and "low capacity"-type WE-projects (see section 5.2.2.). All possible categories of stakeholders involved in implementation arrangements of all 30 WE-projects were addressed, equaling a total of 197 different organizations of 14 stakeholder categories.[178] The main goal of the survey was to capture the interplay of the public and private actors involved in such authorization procedures. To validate the list of NGO advocates and opponents, which was first put together by desk research, the sample frame was then reviewed and complemented by an independent policy expert on the topic.

The author went to great lengths to ensure the political neutrality of the formulations in the survey and of survey administering, including communication. Nonetheless, the survey was met with strong resistance among some organizations that oppose the further construction of WE-turbines in Switzerland. The choice of topic alone was deemed to be enough evidence for a proponent-bias.[179] Especially among those organizations that stand in fundamental opposition to the development of WE in Switzerland, this research project was viewed by some addressees as the brainchild of an "administration-establishment-science"-complex, which some have regarded as fundamentally biased against them and their interests.[180] Overall, this has led to a non-negligible underrepresentation in my survey of NGOs in Switzer-

177 Following the modalities of response rate 2 of the AAPOR 2016.
178 These categories are: ARE, BAFU, BAZL, BFE, ESTI, municipality, canton, other public actors, opponent NGOs, proponent NGOs, developers, mandatee companies, Swissgrid, regional grid distributors.
179 "You are not asking the relevant questions" or "These questions are tendentious" were common responses among those organizational representatives declining to participate.
180 For example, I have received dozens of respectless e-mails and physical letters, casting me as an enemy of biodiversity, landscape and the environment more generally. I mention this to illustrate the extent of political entrenchment surrounding the topic. This also echoes the point made in section 5.4.4. about the increase in coarseness surrounding the topic.

land that fundamentally oppose wind energy, based on steadfast principles. Crucially, this underrepresentation is not the case for those project-specific opponents who are against a project because "it is a bad project" but who are not fundamentally opposed to the development of WE in Switzerland more generally. The strategy to correct for this bias has been to weight responses of the various stakeholder categories; this, however, was only done in measures where the relative stakeholder category weight matters.[181]

The survey itself presented targeted questions depending on the stakeholder category of the respondent. The total of 14 stakeholder category groups were collapsed to six for simplification. This resulted in six different versions of the survey per language. As the survey was provided in three languages (German, French, Italian), there was a total of 18 versions. A two-step pre-test was applied: It was first pre-tested with a spatial development expert working at the canton of Bern, and in a second step it was sent to a selected academic audience at the Institute of Political Science of the University of Bern. My part-time student collaborator L. Vogel[182] ensured consistency in the different language versions and checked for errors in the technical implementation on the Qualtrics web-survey software, on which it was implemented.

In total, the survey contained 24 questions, divided in nine thematic sections (invisible to the respondent).[183] It contained four larger "network-style" questions on the four themes of collaboration, collaboration above-legal-minima, agreement/conflict and trust/mistrust. A "network-style" question refers to a matrix-like list of organizations (rows) and a scale of a criterion

181 Weighting was only necessary concerning reputational power and its derivatives. In these measures, however, weighting was not assumed to be specific to opponent NGOs, as there are some missing data from other stakeholder categories as well that were addressed. Reputational power scores were based on equalizing how many nominations of reputational power by main stakeholder category were given (developers gave 128 nominations in total, municipalities 151, cantons 113 and opponent NGOs 90). Most measures, however, do not compare stakeholder groups with each other, and no weighting is necessary. Some measures, however, err on the conservative side, underestimating potential opponent effects and therefore presenting a "hard" test.

182 She worked with me during the data collection phase at 20% from March 2020 to August 2021.

183 1. Collaboration, 2. Reputational power, 3. Agreement/conflict, 4. Trust/mistrust, 5. Questions on organization-internal treatment of WE-authorization procedures, 6. Satisfaction with the current distribution of legal competences, 7. Social acceptance, 8. Satisfaction with the current state of the authorization procedure, 9. The respondent organization's orientations regarding WE in Switzerland.

(columns). Respondents were asked to rate each organization using the scale, e.g. of collaboration frequency. To this matrix they could also add organizations that were not on the list that I fed in for each project, based on desk research and the PCS. Because some organizations, such as cantons, larger NGOs and the federal offices, have dealt with several of these 30 projects, they would have technically needed to fill in the survey as many times as they had been part of the implementation arrangement. If, for example, the BFE were to have perfect correspondence between the number of projects in which it was involved and the number of their survey answers, it would have had to fill in a similar survey 30 separate times. Because this is not feasible for obvious reasons of respondent surcharging, the strategy consisted in organizing (virtual) meetings with representatives of these organizations. With organizations being involved in more than six projects, the respondent(s) and the researcher filled in the survey for one specific project together, and with each of the four network-style questions the researcher asked how the indicated pattern would look different for the other projects in the respondent's project portfolio. This way, validity of measurement could be ensured, and single-project networks could still be constructed. For the BFE, for example, this means that, in the sample of the 30 WE-projects, the researcher received a single original response and adapted responses for the 29 other projects based on noted pattern differences.

In addition to observing multiple WE-projects per stakeholder, there are also cases of two cantons, multiple developers and/or multiple municipalities that are involved in a single project. An organization can be part of the opposition NGOs for one project but part of the NGO proponents for another one. As respondents were not able to indicate relations to and within their own organization, the lists in the network-style questions had to be individualized per respondent organization as well, in addition to being individualized per WE-project. This required quite a sophisticated input-feeding setup based on knowing the role and involvement of the respondent. Hence, respondents received individualized links per project and their stakeholder category.

Together with the NCS, many additional secondary data were needed to run the analyses. Table B in the online appendix gives an overview.

6.1.2. Constructing implementation arrangements as networks

Many preparatory steps were needed to produce the analyses for the first link in the analytical model. This included the transformation of data into network objects,[184] which required some prior imputation [185] and the elimination of the nefarious “doubling” problem.[186] This led to 564 unique nodal identifiers based on a total of 197 unique organizations. In a last step, nodal covariates had to be fitted for analyses. Having 564 nodes over 30 projects and 17 cantons means that, depending on whether the nodal covariate is averaged by project or by canton, there are usually multiple identical values for a covariate across multiple nodes. Such a strategy leads to overestimating statistical significance in regular multiple linear regressions. To counterbalance such “statistical significance inflation”, extensive robustness strategies were developed and applied.

The majority of nodal covariates are results of automated network routine calculations, i.e. degree, density, betweenness, among many others (see glossary in the online appendix).[187] Following a strategy of maximally reducing bias and providing alternative measures for robustness checks, 18 different networks for each of the 30 project’s implementation arrangements were specified. First, survey respondents were able to name additional organizations to a pre-given yet highly customized list of organization names. But because other respondents were not able to answer for an individual respondent’s added organizations that another respondent did not add herself, fewer edges are indicated in the project network than would realistically be present. However, their inclusion also provides additional information. To find a practical solution, the study used several “forms” of networks. One “form” of the network contains these individually added organizations (“all”), a second form removes them (“pre-given”), and a third form, chosen for its very high

184 To construct networks, most guides (e.g. Yang et al. 2017) recommend to produce separate edgelists that contain the relations (*syn.* edges) and their weight) and node lists (containing the included organizations’ names and their attributes; *syn.* vertex, see glossary in the online appendix) that the software-packages can easily combine into a network-class object.

185 Because of organizations having several projects but not being able to answer individually for each, some data first had to be imputed. Every answer score imputed into other projects based on the original project has been meticulously documented, especially if the meeting notes provided for a reason to change the imputation into one direction or another.

186 A stakeholder may take on multiple stakeholder categories across different projects. This has led the list of actors to expand, with the node finally being unique using three consecutive identifiers of stakeholder category, project title and cantonal affiliation of organization.

187 These were calculated using the *igraph*-package (Csárdi and Nepusz 2006). Tables of routines-based variables for testing are available upon request.

data availability, reduces the project networks to containing only stakeholder organizations from four main categories ("main categories"). These "main" categories are the cantons, municipalities, developers and opponent NGOs (see 5.19).

Second, social networks further have an inherent problem with where to set the boundaries; thus, networks have built-in difficulties as their samples are rarely to never complete. This "network completion problem" (Kim and Leskovec 2011) has given rise to modeling and computational innovation (see Huisman and Krause 2017 for an overview). Many completion algorithms (e.g. Ghasemian et al. 2020; Forsati et al. 2016; Clauset et al. 2008) have since been developed. To further reduce possible bias in the organizational network models, a series of three networks per project-network were generated that differ by their "mode". The first includes edge weights as indicated by the scale that the respondents used. The second mode deletes edges that have non-intensive relations to create binary networks, with edges being reduced to being present or absent.[188] To correct for possible bias in edge completion and because the selected algorithm cannot take into account pre-existing edge weights, the binary network was used as a basis for the hierarchical edge prediction algorithm by Clauset et al. (2008).[189] The algorithm generates edge existence probabilities, which were thereafter interpreted as edge weights. Third, two "types" of networks were generated, with either summarizing every organization by its stakeholder category (taking the mean of their values), which the author has labeled "category networks", or leaving them by organization name, which are called "organization name networks".

Table 6.1 presents an overview over these three network generation multipliers. Hence, in total, 18 networks were generated per WE-project network. Because running the routines over all 18 networks per project would have generated several thousands of variables, only those networks were selected for routine calculation that were expected to contain the least amount of bias with the maximally available richness of information. The glossary in the online appendix allows readers to look up calculated routines and what they mean mathematically and sociologically.

188 For the collaboration networks and the above-legal-minima collaboration networks, respondents indicating a weight of 0 and "1" were deleted. In the agreement/conflict networks, edges carrying weights of 0, 1 and 2 were removed (denoting conflict), in the trust/mistrust network this was the case for edges carrying weights of 0, -1 and -2 (eliminating mistrust).

189 This algorithm has been implemented in the *igraph*-package (Csárdi and Nepusz 2006).

Table 6.1: Organizational project networks generation specifications

Form	**Mode**	**Type**
Who included?	*Modeled how?*	*Nodes are...*
All	Survey edge weights	Stakeholder categories
Pre-given list	Binary reduction	Organization (names)
Main category actors	Predicted edges	

The methods I use to analyze the data with are either descriptive or employ inferential statistical methods. The latter contain multiple linear regressions, mediation models and ERGMs. All of them have been automated.

6.1.3. Testing, robustness and reporting thresholds

This section presents the statistical modeling procedure for the three types of statistical models used in this chapter: multiple linear regressions, linear mediation models and ERGMs. The subsequent explanations follow in this order.

Network-aspects of implementation arrangements as dependent variables

The chosen testing strategy is an iterative one, where only a single measure of decentralization (component, dimension or highest-level aggregate) concurrently figures as part of a single statistical model. The decentralization variables contain a total of 31 singular measures,[190] comprising peak-level aggregates, dimensions and components. Such an iterative treatment will permit an analysis of which aspects of the independent variable (IV) of decentralization have a (non)negligible impact on effectiveness-relevant aspects of implementation arrangements. The partisan variables, in turn, are taken from Vatter et al.'s (2020a) database on "Patterns of Democracy in the Swiss Cantons". For most of these data the mean was taken over 2000–2018 to account for the cross-sectionality of the analyses. Like the decentralization indicators, partisan indicators were also tested iteratively, with only one

190 Mueller's (2022, 2015) measures, Ladner et al.'s (2021) LAI and complementary FinStat (2021) data.

variable included per model. Partisan and decentralization variables were often combined, resulting in the majority of models having both partisan and decentralization effects as IVs.

How did the study detect explanatory factors? The identification of decentralization and partisan explanatory variables followed a two-step procedure: First, the calculation of multiple linear regressions was automated to cancel out model-specific effects stemming from (single or grouped) inclusion or exclusion of factors. The number of times an IV was included in these automatic models ranges from 24 (network routine control factor) to 1920 (general control factor). For both categories of actor constellation and modes of interaction models, the automatic regressions were fed variable combinations based on 67 total IVs and 53 dependent variable (DV) specifications.[191] For actor constellation models, the DVs measure five different substantive concepts, and for the modes of interaction there are also five substantive concepts used as DVs. IVs consisted of decentralization and partisan measures. As model controls, variables of the analytical category of actor orientations as well as other actor constellations and modes of interaction that could act as confounders were added. Additionally, a few political system and general confounding variables were added to the set of model controls (see section 5.3.). The composition of IV-combinations was not chosen at random: For each substantive concept in the DV, a set of IVs was defined that are theoretically likely to influence the DV. 1–11 IVs were included in the models. Only one single measure of decentralization was included per model as to prevent obvious multicollinearity in the models. Homoscedasticity of errors and the linear functional form of relations were assumed but not tested. Multicollinearity was tested and found to be unproblematic. The testing instrument of automated regressions was chosen because the size and significance of model coefficients may vary strongly across only a slightly different model specification. Automation, in this sense, is expected to cancel out average misspecifications in the models and is also a measure of robustness. The basic setup of the linear regressions, however, is relatively simple, as seen in the following stylized textual equation (6.1):

191 These numbers resulted from a deletion of those combinations of network specifications that likely contain bias without having an advantage over the other specifications.

$$network\,aspect_{kl} \longleftarrow decentralization_{i\,OR\,j} + partisan_{i\,OR\,j} + controls_{ikl\,OR\,jkl} \quad (6.1)$$

where:

i = canton
j = municipality
k = project
l = theme
m = political party

In a second step, results of the automated models were summarized. The summary path consisted of the following strategy ensuring the high robustness of results: The number of models, in which each IVs was significant as a proportion of the number of estimated models that contains said variable, was calculated. The cut-off point for this proportion was set at 90%, meaning that variables that were significant 89% or less in models in which they were included are not reported as significant. To the individual models, the usual levels of significance of $p < 0.05$ were applied. Moreover, if there were two alternative DV-measures of the same concept, significance was needed for the IV in models with both DVs to be deemed robust enough to be included as a significant explanatory factor. In addition to the cut-off point of 90% of models per IV and DV, further thresholds for IV significance across DVs were formulated for one, three, four and six alternative DV-measures of a single concept.[192] Reference tables that show the percentage of significant models by independent and DVs are available upon request. For effect sizes, the IV- or control-estimates were averaged across all models in which they were significant. Overview tables for these data are available upon request as well. In addition, only those effects shall be reported that have a mean effect size that is materially important.[193] For further robustness reasons, a second summary path was pursued and the results were compared.[194]

192 For six alternative DV measurements, the IV had to be significant in minimally five; for four DV-measures, it needed to be significant in three. For three alternative DV-measures, the IV needed to be significant in all three.

193 There were plenty of significant variables that have passed the threshold but whose effect turned out to be zero on average, which will not be reported.

194 The second pathway used the following strategy: Instead of taking the mean only of those estimates in which the estimate was significant, the second strategy consisted of taking the mean of the p-values for each IV for all models across the same DV-measure. Significance of the estimates was then based on the mean p-value being

Much like the multiple linear regression models, the estimation of mediation models was also automated. To do this, decentralization measures were used as IVs (called "treatment variables"). Based on theoretical likeliness and intermediate results from multiple linear regressions, the number of organizations, veto players and political party variables served as mediators. The same aspects of implementation arrangements were used as DVs. Compared to the estimation approach with multiple linear regression, the automated mediation analysis approach shows two major differences: First, mediation analysis followed the leads of the results of the multiple linear regressions; therefore, the set of tested variables was much reduced compared to the linear regression automation of models. Second, mediation estimation was also limited in that it held control variables constant across changing mediators and IVs per DV, which the multiple linear regressions approach did not. Still, multiple sets with different sets of control variables as confounders were estimated. Estimates (total effect, effect on mediator, mediator effect, average direct effect (ADE), average causal mediation effect (ACME)) were averaged based on proportion of models in which either the ADE or ACME were significant. As above, the relation was retained if more than 90% of estimated models showed the relation to be significant at $p < 0.05$. The stylized textual equations (6.2) and (6.3) show how the models were set up.[195]

Mediator models:

$$mediator_{k\ OR\ m} \longleftarrow decentralization_{i\ OR\ j} + partisan_{i\ OR\ j} + controls_{ikl\ OR\ jkl} \tag{6.2}$$

below 0.05. Estimates were also averaged across all models of the same DV-measure if the mean p-value was significant. For multiple DV measures of a single concept, the same reporting thresholds were necessary (one out of one, two out of two, three out of three, three out of four, five out of six). Overview tables for these data are also available upon request. The two summary strategies have 83% of significance-detection in common, meaning that they overlap to a large extent but not fully. For the not-doubly confirmed 17%, the first strategy takes the mean of estimates only across the models in which the IV was significant. The reporting threshold is reached if the IV was significant in 90% or more of the models in which it was tested. Only estimates of this first strategy are shown and interpreted. The reason behind this two-fold summarizing and validation strategy is that the case-inflated node list likely overestimates the significance because of the "doubling problem" in the node list due to node uniqueness needing three identifiers (stakeholder category, project title and cantonal affiliation of organization).

195 There was no second summary pathway for mediation models. Mediation models were estimated using the *mediation* package by Tingley et al. (2014).

Full models:

$$network\ aspect_{kl} \longleftarrow decentralization_{i\ OR\ j} + partisan_{i\ OR\ j} + mediator_{k\ OR\ m} + controls_{ikl\ OR\ jkl} \tag{6.3}$$

where:

i = canton
j = municipality
k = project
l = theme
m = political party

Exponential random graph models (ERGM)

Why do some collaboration, agreement/conflict or trust/mistrust ties exist while others do not? Using ERGMs, it was also checked whether decentralization helps explain the probability of existence and intensity of ties. As for the mediation models, the selected variables followed the lead of the results of the automated linear regressions. To go about modeling the probability of ties, the study estimated so-called *ergmitos*.[196] They estimate the probability of existence of a tie. The models use the set-up as shown in the stylized textual equation (6.4):

196 The software package with the same name spells out "exponential random graph models for little networks" (Vega Yon et al. 2021). It uses the Spanish diminutive to denote its design for small-n networks for *R* (ibid.).The estimation method has been developed for and is restricted to maximally incorporating eight nodes in an undirected network (ibid., 6) due to the fact that it calculates a maximum-likelihood estimator rather than other random graph methods for larger networks that use approximations or simulations to do this (ibid., 4). The latter would be highly problematic for small networks because likelihood-function simulation methods tend to have problems producing accurate estimates due to the convex-hull problem in such "small number of nodes" settings (ibid., 4). Moreover, *ergmitos* have specifically been designed to use a sample of networks stemming from the same network generation mechanism "[...] to analyze variation both within and across small networks" (ibid., 6). Rather than the common workaround for cross-sectional ERGM-estimation putting together a block-diagonal model with structural zeroes between each of the network, the *ergmito* package for small networks simplifies the estimation process by improving flexibility and reducing simulation convergence problems.

$$\textit{unweighted and undirected ties}_{kl} \longleftarrow \textit{decentralization}_{i\ OR\ j} + \textit{partisan}_{i\ OR\ j} + \textit{controls}_{ikl\ OR\ jkl} \quad (6.4)$$

where:

i = canton
j = municipality
k = project
l = theme

The set-up was simplified to the extent that it did not include differently specified networks of the same theme and concept (form, mode and type held constant across models). To be able to estimate cross-sectional ERGMs, one had to operate with a small number of nodes. To achieve this, the study decided to use the type of stakeholder-category networks and reduced them even further to include only the main categories of developers, cantons, municipalities, and opponent NGOs. The ordinal scales were reduced to binary relations, where the relation is counted as present if there is medium to high collaboration, medium to high conflict (agreement being counted as an absence of relation) and medium to high trust (mistrust being included as the absence of a relation).[197] The study ended up modeling 186 *ergmitos*. The resulting coefficients were transformed to probabilities of existence of a relation between various constellations of main stakeholder-category nodes. For present purposes, only nodal covariates were used to explain probabilities of a tie between a pair of nodes with the same level (minimal, maximal OR mean) or different values (minimal AND maximal) in the nodal attribute of interest. The resulting coefficients were then transformed from log-odds to probabilities, which is what will be reported on.

197 These networks were operationalized in two ways, both allowing for isolates (see glossary in the online appendix): A first way consisted of generating these small networks by removing loops (ties to the same stakeholder category). A second way generated these small networks and removed loops as well; additionally, however, instead of using all 30 project networks, those networks that only contained isolates were discarded, thus reducing the sample to 29 for the agreement/conflict theme and 24 for the trust/mistrust theme. In the collaboration-themed cross-section, the full 30 project networks remained. Results of the two operationalizations (that differ minimally in terms of magnitude and statistical significance) were compared. Only coefficients that are significant in both operationalizations are reported.

6.2. Decentralization between cantons

As discussed and selected in the theory section (3.1.2.), Mueller's (2015, 2022) decentralization index has been chosen for the within-national comparison between the cantons.[198] To check for the robustness of results, alternative measures like Ladner et al.'s (2021)[199] LAI and relative fiscal expenditure and income data from the Finstat-database of the EFV (2021) were tested as well.[200] Effects of these additional measures were also estimated but remain uncommented unless they point to a different interpretation of inferential findings later on.

Because table 5.11 already showed the differences between cantonal hosts and non-hosts regarding the independent variable of decentralization, the index shall be explained in detail graphically. The index' minimal, maximal, mean and SD-values can be found in table D in the online appendix.

Figure 6.2 presents the highest-level aggregate of decentralization and its three dimensions as maps of Switzerland. A darker gradient indicates a higher degree of centralization. For the highest-level index (top-left), what one can detect is a West-to-East gradient towards more positive scores indicating higher degrees of cantonal decentralization. GR has the highest score by far, and the cantons of the Romandie (except JU) have smaller scores, indicating lower decentralization. The canton of GE is the scale's extreme low score. The cantons of AI, AR, SG, SH, TI and UR are somewhat "atypical" compared to what the East-West gradient would prescribe. The three officially bilingual cantons (BE, FR, VS)[201] can be said to act as a "bridge" between the German-speaking part of Switzerland and the Romandie. Indeed, what Mueller finds is that the language divide is the most important explanans for cantonal decentralization (see section 5.4.1.).

The map of the polity dimension (top-right) looks similar, although OW and ZG seem more decentralized in this dimension than on the highest aggregation level of the index. They seem to be the extreme points on the decentralized end of the spectrum, whereas NE appears to be its centralized endpoint. Decentralization in the polity dimension denotes the degree of

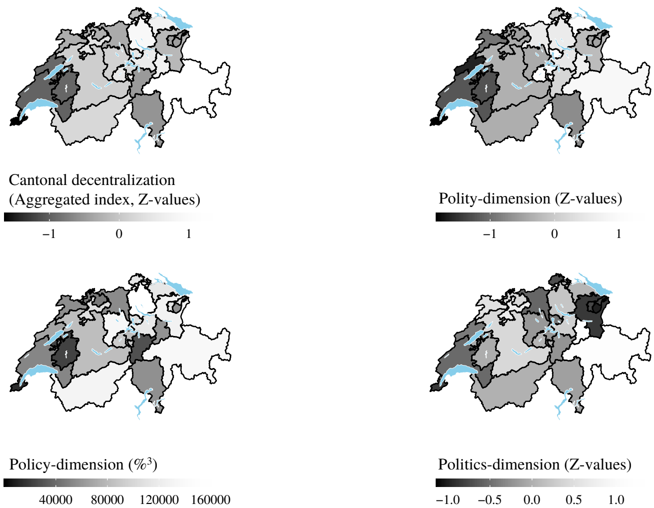
198 From here onwards and in this chapter, Mueller's decentralization index not cited in running text anymore for reasons of legibility.

199 From here onwards and in this chapter, Ladner et al.'s LAI not cited in running text anymore for reasons of legibility.

200 From here onwards and in this chapter, fiscal data from the Finstat-database is not cited in running text anymore for reasons of legibility.

201 The officially trilingual canton of GR has been counted as a German-speaking canton.

Figure 6.2: Graphical depiction of Mueller's (2015) decentralization index and its dimensions.



Notes: A darker gray shading indicates higher centralization.

local autonomy, of which municipalities in GR have the most. In contrast, the map of the policy dimension (bottom-left) does not seem to conform to this East-West gradient. ZH and LU are the most decentralized, and BS along with FR and GE are the most centralized. The policy dimension measures relative local resources, of which ZH and LU municipalities have the most. The map of the politics dimension (bottom-right), in turn, shows a surprising shading in that the cantons of AI, AR, SG and SH appear to be highly centralized. In these cantons, local and regional elections are more strongly determined by the cantons, there are few multiple mandate holders on the local and cantonal level, and/or municipalities have lower control over cantonal legislation development.

One conspicuity of Mueller's measurement needs to be addressed: He uses the item of "perceived local autonomy" as a component of the polity dimension, stemming from Ladner et al.'s (2021) multi-wave survey of municipal secretaries. The item asks municipal secretaries to rate the autonomy of their municipality on an ordinal scale of 1–10, with low values indicating low autonomy. Interestingly, since 1994, this self-rating of autonomy has continued to decline overall, from a mean cantonal score of 5 in 1994 to 4.96 in 2005 to 4.59 in 2017 (Ladner et al. 2021). Thus, the general perception is one of decreasing autonomy self-ratings over time. Crucially, the item has been criticized because it relies not on an "objective" measure of the polity but rather on the subjective judgment on it, which means that its validity could be questioned. However, this item has been used as a polity measure in different studies (e.g. (Mueller 2015; Mueller et al. 2017)), and the experience the survey taps into when questioning municipal secretaries could also be regarded as particularly valid: Municipal secretaries bring in much more experience in their ratings than a presumably objective measure by the researcher could. Moreover, as Mueller (2015) has shown, the measure of perceived local autonomy correlates strongly with alternative and arguably more objective measures of polity decentralization, such as Fiechter's (2010) indices on "existence and autonomy guarantee" or on "organizational freedom". Hence, there is not much need for undue skepticism about the validity of the measure.

6.3. Decentralization effects

This section presents the findings of the three analytical strategies (multiple linear regressions, mediation regressions, ERGMs) one-by-one, culminating in an interpretative effort where the findings are compared. The section starts with the linear (non-mediated) automated regression analysis, then present results from mediation analysis before continuing with results from ERGMs.

6.3.1. In non-mediated models

In multiple linear regressions, Mueller's measure of decentralization and its dimension and components show various robust effects on actor constellations and modes of interaction in implementation arrangements. The structure of the reporting follows the order of the familiar categories of Mueller's dimensions: polity, policy and politics, followed by a discussion in important controls.

Before diving into the dimensions and components, the highest-level aggregate of Mueller's cantonal decentralization merits some discussion as well: Greater cantonal decentralization only has an effect on the modes of interaction. It appears to be the case that decentralization correlates with higher density of collaboration in WE-implementation arrangements.[202] An increase of 4% of this density is observable for an increase of 1 SD in cantonal decentralization. 1 SD represents 1/3 of the empirical range observed for cantonal decentralization. A 4%-density change is a moderate effect size. Moreover, it is interesting to see that the mode-of-interaction variable of intensity of collaboration also shows an effect in the same direction but with a larger magnitude: For an increase of 1 SD of greater decentralization, the intensity of collaboration increases by 0.05 points. This equals 1/2 SD of collaboration intensity. More decentralized cantons thus collaborate more intensely with their municipalities, at least in matters of WE-authorization procedures. This is likely due to necessity: More powerful municipalities require more interaction with the cantons. But it is also surprising from an intuitive point of view as more decentralized cantons could be thought of as acting more independently. The available data does not support this general assumption of greater independence. Rather, it shows that the inverse is the case for the selected problem of implementation, i.e. WE-policy implementation in Switzerland.

Effects of the "polity" dimension of decentralization

Taking a closer look at the polity dimension of Mueller's dimension of decentralization, there is one measure that shows both high robustness and also sizeable magnitude: the perceived local autonomy as indicated by municipal secretaries.[203] An increase of perceived local autonomy by 1 point (roughly 1/7 of the observed range) influences aspects of actor constellations. It increases the number of organizations (i.e. the size of the network) in the implementation arrangement by 0.88 and the number of veto players by 0.71. The finding of a positive effect on the number of organizations is very robust to alternative items to perceived local autonomy.[204] The finding of a

202 The density of a network describes how many of the involved actors collaborate with each other. A network in which every actor collaborated with every other actor would be called "complete" and would show a density of 1; see glossary in the online appendix.

203 Mueller's outdated data from 1994 and 2005 was updated with the 2017 data (Ladner et al. 2021).

204 In Ladner et al.'s LAI (2019a; 2021), the item "administrative supervision" is significant: The more limited the administrative supervision (high values denote more

significant increase of veto players could not be repeated with similar related items measuring polity aspects of decentralization. Although the threshold already sets strict robustness standards regarding alternative model specifications, no robustness for the relation between perceived local autonomy and veto players with regard to alternative measures by other researchers can be claimed.

The finding bears material importance, as it states that WE-authorization procedures happen in larger implementation arrangements when a polity is (perceived to be) more decentralized than where it is (perceived to be) more centralized. The phase of advancement has been controlled for. Decentralization is associated with a proliferation of involved organizations and, less robustly, with veto players. To be clear: Implementation arrangements in decentralized settings do not have more involved public agencies (cantons, federal agencies, municipalities, regional planning agencies), as there are only general-purpose public agencies within any cantons that are involved in any case. Rather, the additional actors that are associated with greater perceived local autonomy are private actors. Two scenarios are imaginable: A more powerful municipality might be targeted more frequently directly by private organizations that seek influence, because in such cases municipalities have greater autonomy in decision-making, and what interest groups "can get out of it" is more consequential in comparison to what interest groups could achieve when convincing powerless municipalities. Another scenario is that more autonomous municipalities have need of greater knowledge and must actively recruit outside organizations to help them in fulfilling their duties (which they would not have if they were not as autonomous). In light of the previous findings, the graph of trust intensity in implementation arrangements (figure 5.7) shows that municipalities tend *not* to be strongly captured by NGO opponents or proponents, which would lend plausibility to the second scenario of greater outsourcing (to companies that are not depicted in the graph) than to the first that expects venue-shopping by political actors. This is also convergent with the finding from section 5.6.2. that did not detect meaningful venue-shopping.

limited supervision), the higher the number of involved organizations. The magnitude is 0.74 organizations for an increase of 1 (1/3 of the scale). An effect is also found concerning the strength of legal protection of municipalities. A more secure legal standing and the existence of formal complaint opportunities is associated with a significant but small increase in the size of the network.

The fact that perceived local autonomy does not influence veto players as strongly as it influences the number of involved organizations in an implementation arrangement points to the fact that growth of the size of an arrangement is not only due to additional veto players. WE-proponent organizations are typically of this sort. The effect on the growth of veto players might also not be as strong because of the two municipal scenarios. On one hand, both veto- and non-veto-organizations are likely to seek influence in a relatively more powerful municipality. On the other hand, municipalities are likely to offload tasks to non-veto players as well, simply to mandatee companies that handle technical spatial planning or other tasks on their behalf. Even though through providing information to the municipality these mandatees have substantial shaping power, they have no formal decision power by themselves.[205]

In the context of a mean implementation arrangement size of 18 organizations and eight veto players, having one organization more or less in association with decentralization does not seem that much. For the smaller arrangements, however, it matters strongly whether there is a fourth veto organization or whether there are only three, of which three are likely the public ones. Moreover, both the number of organizations and the number of veto players are strongly correlated with each other. As you cannot add a veto player without adding an organization, this is to be expected. However, what is important and crucial to the subject under consideration is that the statistical models show the two variables to be significant and materially non-negligible predictors of agreement/conflict and trust/mistrust intensity.

How does the number of veto players and the number of organizations affect agreement and trust? Let us first investigate the effect on the intensity of agreement/conflict, an actor constellation measure that captures to which extent actors agree (+1, +2) or disagree (-1, -2) with each other (neutral: 0). The number of organizations has an opposite effect to the effect of the number of veto players. Whereas the number of organizations is associated with a small increase in agreement intensity, the number of veto players is associated with a reduction in said intensity (greater conflict). The positive effect of the number of organizations might be that in larger networks there are proportionally more involved organizations that agree with each other than do not. This would suggest a certain "bandwagoning" effect — when organizations expect a set of preferences to prevail, they join in, hoping to

205 Some organizations are both: They have a consulting "wing" where they conduct mandated science, but they also have a political one (e.g. "Vogelwarte Sempach"). In this case, they are counted as a veto organization.

reap benefits (Lazarsfeld et al. 1944). A likely cause of this are the positive effects of stakeholder engagement strategies (see, e.g., Haddaway 2017; Lovan 2017). In terms of magnitude, a larger implementation arrangement adds 0.03 intensity points of agreement for a 1-organization increase in size of the network. This represents about 1/9 of the agreement/conflict intensity SD.

Crucially, however, once organizations are veto players, the effect is inverted. An additional veto player reduces agreement intensity or, put inversely, increases conflict intensity. The effect, compared to the number of organizations, is about triple in magnitude, hence adding a veto player leads to lower agreement by -0.09 intensity points. Hence an added veto player is associated with a decrease in agreement intensity of about 1/3 of its SD. This effect is highly robust across model specifications and follows the direction of the competitive veto player hypothesis (see, e.g., Tsebelis 2002; Crepaz 2002).

Regarding trust/mistrust intensity, the direction of effects is the same as for the agreement/conflict intensity: When a single organization is added to the implementation arrangement, there is a slight increase of 0.02 points in trust intensity (1/15 of its SD). If, however, the effect of the number of veto players is examined, a substantial negative effect on the intensity of trust can be found, amounting to 1/3 of its SD.

What these considerations have suggested is a performative effect of the number of organizations and veto players on agreement and trust, which are impacted by decentralization measures themselves. A *direct* effect of decentralization measures on agreement/conflict intensity did not pass the reporting threshold but will be found in mediation models (weak direct effects). The number of organizations as well as the number of veto players will therefore be scrutinized as mediators in detail in section 6.3.2.

Are there other determinants of the number of organizations or veto players besides decentralization? For the number of organizations, the difference in reputation power between the proponent and opponent coalitions proved to be highly robust:[206] The larger the difference in reputational power scores, the higher the number of organizations involved. The same could be observed for the number of veto players that could also be explained by the size of the difference between opposing coalition reputational power scores. This finding can be read in two ways: Either larger differences in opposing reputational

206 Proponent and opponent coalitions were classified based on actor orientation factor scores, with 0 acting as a cut-off point. Above 0, organizations were classified as proponents; below 0, organizations were classified as opponents.

influence indeed lead others to join in some sort of "power-balancing effort". Or it could be imaginable that there is a problem of endogeneity: It seems at least equally likely that a higher number of organizations or veto players lead to an increase in reputational power differentials.

As another determinant of the number of veto players, but not of the number of organizations, the size of the difference between opposing coalitions' actor orientations has been found to have a positive effect: The larger the difference in actor orientations, the more veto players are involved. There might equally be a problem of endogeneity here, as it is likely that the joining of additional veto players will lead to greater differences in coalitions' orientations. However, it also seems likely that larger differences in orientations originally drive the decision of whether veto players join an implementation arrangement or not. Why do actor orientations only matter for veto players but not for the number of organizations? It seems likely that greater differences in orientations rather deter non-veto players from joining than motivate them to join in additionally.

Moreover, independently of decentralization, a significant effect of a host municipality being French-speaking on veto player proliferation has been found. If a municipality happens to be located in the Romandie, the implementation arrangement counts 2.81 veto players more. This would point to greater conflictuality in implementation arrangements in the Romandie. But this would not go well together with the Romandie being more centralized in its polity and thereby experiencing a reduction in conflict and increased agreement. Yet these two effects have very different effect sizes, with the increase in conflict due to the Romandie being much larger than the reduction in conflict due to greater centralization. Mediation analyses in section 6.3.2. will treat this issue in depth.

Effects of the "policy" dimension of decentralization

Two of Mueller's components in the policy dimension, fiscal and personnel decentralization, have mode-of-interaction effects: They increase the intensity of collaboration significantly and substantively. 1% of greater fiscal decentralization results in 1/20 SD in increase of collaboration intensity. For 10%, the effect on collaboration intensity amounts to an increase of 1/2 SD. Greater relative local financial resources are thus associated with a non-negligible increase in collaboration intensity. The same goes for personnel decentralization: Greater local resources are associated with a higher intensity of collaboration, but the effect is slightly smaller. Here, an increase of local personnel resources by 10% is associated with an increase of collaboration intensity of roughly a third of a SD of collaboration intensity. Relative expenditures and incomes of municipalities vis-à-vis their cantons (data: EFV 2021) confirm the significance and magnitude of this relationship.

What does this mean for WE-implementation arrangements? These policy items appear to be the driver of the significance of the overall cantonal decentralization index reported above. Of course, having more general relative municipal resources at one's disposition does not necessarily entail that more resources are present for WE-authorization procedures. But even if the municipal counselor dealing with the LLUP would not have higher resources at her disposition, she still profits from higher relative resources of her colleagues and of the general administration. The correlation suggests that relatively higher resources are likely spent on intensifying collaborative bonds: For a municipality facing a project proposal, this is highly likely. Few decisions define municipal politicians more markedly than an authorization procedure for such large-scale infrastructure projects: Their municipalities tend to get a new company, thereby aggrandizing the local tax base often substantially; in addition, residents, flora and fauna are also impacted by these large, industrial turbines. The point is that an authorization procedure is so politically salient and shaping the politics of a municipality for several years, making it unlikely that additional resources are not spent to assess, mediate between interests or ensure the full validity of the legal process in a WE-authorization procedure.

Effects of the "politics" dimension of decentralization

Some of Mueller's components of his politics dimension also show to be significant: Like for the components of the policy dimension, politics components only impact mode-of-interaction variables. This time, however, politics-items effects go beyond fostering collaboration intensity, as they also increase an implementation arrangement's collaboration density. The latter is driven by representational decentralization that captures the relative frequency of multiple mandate holders (*cumul des mandats*; see section 3.1.2.). Its effect is enormous in magnitude: A 1% increase in multiple mandate holders is associated with a 29%-increase of density in collaboration. The magnitude of the effect makes it likely that the effect should not have been estimated in a linear fashion, as it would mean that only an increase of 3.5% of representational decentralization would lead to the maximum of density, a complete network. This is highly unlikely. Given the fact that the median of representational decentralization is at 6.8% and thus half of the cantons are below this low number, it is reasonable to expect a strong effect with these lower numbers and a low to very low effect of those above the median.

The politics-dimension component of direct-democratic decentralization (see section 3.1.2.) measures the easiness with which municipalities (its people and officials) may challenge or propose cantonal-level legislation on an ordinal scale of 0–4. The higher the direct-democratic decentralization, the higher also the intensity of collaboration. The magnitude of the effect is also large. For an increase of 1 point (empirically observed range = 4 points) in easiness of direct-democratic contestation/proposition there is an observed increase of the intensity of collaboration of 0.02 points or 1/5 of its SD. For WE-authorization procedures this means that multiple mandate holders and direct-democratic contestation/proposal rights increase collaboration in arrangements that implement WE-authorization procedures.

6.3.2. In mediation models

The models examine decentralization as a treatment, the number of organizations and veto players as mediators, and decentralization as a mediator. The section describes the results in this order.

Decentralization as treatment

The number of organizations and the number of veto players involved in implementation arrangements can be explained partly by polity decentralization measures such as perceived local autonomy. As mentioned in passing already, there is also a negative effect of the number of organizations and of the number of veto players on the actor-constellation characteristics of agreement/conflict and trust/mistrust intensity. As a consequence of these findings from non-mediated linear regression models, it was further tested whether the number of organizations and the number of veto players could act as mediators for decentralization variables on the said agreement/conflict intensity.

Figure 6.3 depicts the model showing that a mediation effect is indeed detectable. With an ACME of -0.07 of reduction in agreement/conflict intensity (meaning more intense conflict) due to the number of organizations, the effect captures about 1/4 of a SD reduction in agreement intensity. Considering that the remaining ADE is only -0.03 points (roughly 1/9 of a SD) and the proportion mediated amounts to 69%, this shows that the number of organizations is a major mediator. The mediation model using the number of veto players shows the same mediation effects, with the only difference being that effect magnitudes and the proportion mediated are even a little larger.

For the trust/mistrust network (not shown), the mediation models using perceived local autonomy as a treatment and either the number of organizations or the number of veto players as a mediator also shows highly significant ACMEs. However, in both models the ADE is not significant. Thus, the ACME presents a full mediation that captures the entirety of the total effect. For trust, the mediators of the number of organizations and veto players are even performing better than for the agreement/conflict intensity characteristic of an implementation arrangement.

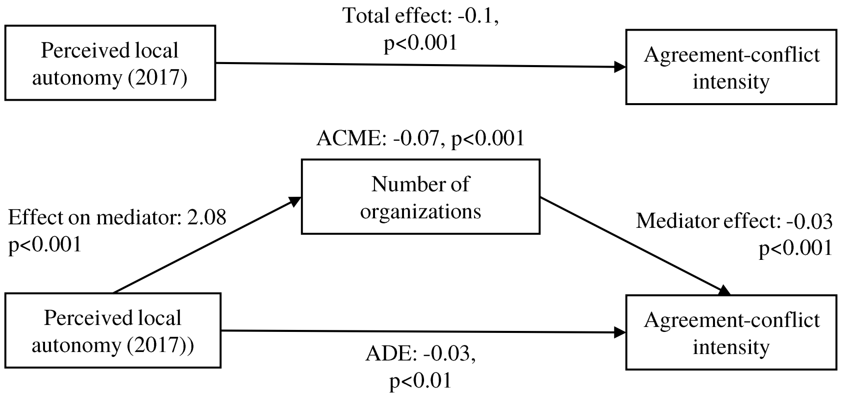
The study further checked whether alternative measures of polity decentralization, such as the strength of administrative supervision and the strength of legal protection (data from LAI), would confirm these mediation findings. Both treatments with both mediators and both actor constellation characteristics of agreement/conflict and trust/mistrust intensity confirm the relations fully — even with slightly larger effect magnitudes. So the relation between polity decentralization and the actor constellation characteristics of agreement/conflict and trust/mistrust intensity is indeed robust to mediation specifications.

The number of organizations and of veto players as mediator

As briefly touched upon in section 6.3.1., non-mediated regression analysis showed that a WE-project being located in a French-speaking municipality correlates strongly positively with the number of veto players. At the same time, Mueller's (2015) main explanation of decentralization scores was the cultural factor of the French- vs. the German-speaking cantons in Switzerland. This makes it likely that the cultural factor might serve as a treatment in mediation models as well. And it is a strong treatment indeed.[207]

207 Integrating cultural variables into an analysis using the ACI, which is based on Simon's (1957) bounded rationality of actors, seems misplaced. But this is not problematic, as the analysis does not relax the assumption of bounded rationality

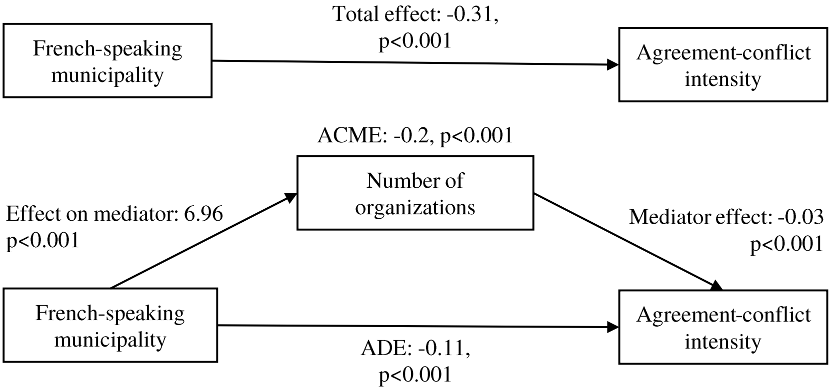
Figure 6.3: Mediation model using perceived local autonomy as treatment, the number of organizations as a mediator and agreement/conflict intensity as a dependent variable.



Notes: Proportion mediated is 0.69. Control variables included in the model were the number of municipal inhabitants (2017, source: BFS 2019), the project advancement stage (source: PCS), the energy harvesting potential from wind by canton (source: ARE 2020a) and how many projects the canton hosts in total (source: PCS).

First, the Romandie is inserted as a dummy treatment into the mediation models. Figure 6.4 presents the model with the number of organizations as a mediator and agreement/conflict intensity as a dependent variable. Being a French-speaking host municipality shows an enormous total effect of -0.31 intensity points of agreement/conflict intensity reduction. Being a French-speaking municipality reduces agreement (and increases conflict) intensity by a staggering 1.1 SD. The effect on the mediator is also impressively large: A WE-project in which the host municipality speaks French increases the number of involved organizations by 6.96. It could further be found that each organization added reduces agreement intensity by -0.03 points (roughly 1/9 SD). The ACME running through the number of organizations lowers agreement intensity with a magnitude of -0.2 intensity points or -0.71 SD simply if a municipality is located in the French-speaking region as compared to a municipality which is not (TI and GR included). The relatively strong remaining ADE further shows that the number of organizations is not the

Figure 6.4: Mediation model using a municipality's French-language as a dummy treatment, the number of organizations as a mediator and agreement/conflict intensity as a dependent variable.



Notes: Proportion mediated is 0.64. Control variables included in the model were the number of municipal inhabitants (2017, source: BFS 2019), the project advancement stage (source: PCS), the energy harvesting potential from wind by canton (source: ARE 2020a) and how many projects the canton hosts in total (source: PCS).

sole mediator; there are likely other factors that remain unaccounted for in this direct effect.

It was further tested whether the relationship also holds for the number of veto players as a mediator. It does. The effect on the mediator is slightly smaller, but the effect on the dependent variable of agreement/conflict intensity is slightly larger. Moreover, the mediator path fully accounts for the total effect size, leaving only an insignificant ADE and a proportion mediated that is larger than 1 for this reason. If one tests the same mediation models with a different dependent variable of trust/mistrust intensity, the same overall relations can be shown, with two differences.[208]

concerning actor behavior. In contrast, the treatment of institutions has always been broad in the ACI literature. Moreover, the use of cultural variables as an institution is fully in line with the ACI's principle of declining abstraction (Lindenberg 1991), which seeks to attribute explanatory power to characteristics on the macro-level before resorting to more micro-level explanations.

208 First, the mediator path running through the number of organizations almost completely captures the total effect (proportion mediated 98%), and the ADE is insignif-

Decentralization as mediator

Mueller's (2015) finding of the cultural divide driving cantonal decentralization also needs to be tested. His argument would predict that, if decentralization acts as a mediator for the Romandie treatment, there should be a negative effect of being French-speaking on the mediator of perceived local autonomy. Figure 6.5 shows the model.

The model shows an ACME that conforms to expectations of greater decentralization bringing greater intensity of conflict. The effect of the mediator of perceived local autonomy on agreement/conflict intensity, the total effect and the materially strong remaining ADE conform with this. What is very surprising, however, is that the effect of being a French-speaking municipality on perceived local autonomy is positive, meaning that it has an enlarging effect on perceived local autonomy if a host-municipality speaks French. It was tested whether this is an artifact of the (disputed) item of perceived local autonomy, and it is not: Both polity-decentralization items of administrative supervision and legal protection from Ladner et al.'s LAI (2021) point in the same direction and are significant as well. Instead, the effect might be driven by the selection of dependent variable and might therefore be special. It was further checked whether the treatment and mediator correlate; they do correlate, but not significantly. The low proportion mediated of 13% and the high remaining ADE suggests that the mediator path in this model is not that materially relevant. However, this puts Mueller's findings strongly in question — at least for the polity dimension of decentralization.[209]. Moreover, as noted, the selectivity of the dependent variable might also be out of the ordinary and could be driving the effect.

Concerning the robustness of the model, it was also tested whether the same relations could also be observed with trust/mistrust as a dependent variable. Here, the ACMEs for both mediators of perceived local autonomy (and of administrative supervision by the LAI) are insignificant, suggesting

---

icant when trust/mistrust intensity is modeled. For the agreement/conflict mediation model, this was the case for the model using the number of veto organizations as a mediator, not for the number of organizations. The second difference stems from the fact that, if veto players act as a mediator in a trust/mistrust model, the ADE is positive and significant, whereas in an agreement-conflict model it is not. Thus, if the number of veto players are accounted for, then the effect of a WE-host municipality speaking French is positive for trust.

209 Statistically, his findings might be driven by the policy and politics dimension strictly speaking

that polity-decentralization mediators are indeed “bad” mediators. In all models (all mediators, both dependent variables), the ADE has shown to be very large and negative (around 1 SD of agreement/conflict or trust/mistrust intensity).

6.3.3. In exponential random graph models (ERGMs)

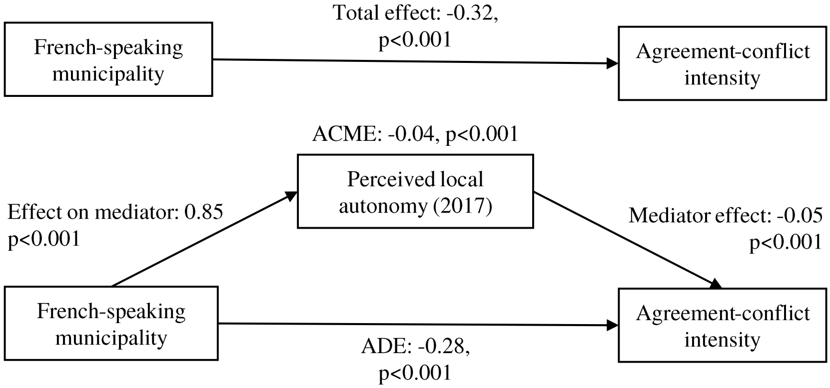
Why do some actors in implementation arrangements form ties whereas others do not? To discover determinants that provide partial answers to this question for WE-implementation arrangements, ERGMs were modeled that estimate the probability of actors forming ties, based on main stakeholder-category participants in small networks. All networks were reduced to binary ones, further taking out the agreement- and mistrust-polarity of the intensity variables, thereby allowing for a “unipolar” discussion on conflict and trust.[210]

Regarding the effect of decentralization measures on the probability of a relation of collaboration, conflict or trust between any two actors, a clear verdict is possible: No decentralization component has a materially important effect. Decentralization does not determine whether organizations in WE-arrangements in Switzerland form collaborative, conflictive or trust ties. Some items show statistical significance, but these are materially so small that they should not be reported as materially present. Put differently, in these small stakeholder-category networks, municipalities in more decentralized cantons seek a similar number and intensity of ties in WE-projects as do municipalities in more centralized cantons. This contradicts the finding of greater intensity and density of collaboration, of increased conflict and of reduced trust in WE-implementation arrangements in more decentralized settings. This will be discussed further below.

Nevertheless, it is important to test whether the specific categories of actors have different propensities to collaborate or to be in conflictive or trustful relations. To this end, a second set of 93 models were modeled that included the main category membership (dummies) as independent variables. With regards to collaboration, it was found that municipalities do not have a higher or lower probability to form collaborative ties than other main category stakeholders among themselves and with other main category stakeholders. In the conflict network, however, the probability that municipalities and

210 See section 6.1.3. for the methodological procedure and reporting thresholds.

Figure 6.5: Mediation model using a municipality's French language as a dummy treatment, perceived local autonomy as a mediator and agreement/conflict intensity as a dependent variable.



Notes: Proportion mediated is 0.13. Control variables included in the model were the number of municipal inhabitants (2017, source: BFS 2019), the project advancement stage (source: PCS), the energy harvesting potential from wind by canton (source: ARE 2020a) and how many projects the canton hosts in total (source: PCS).

others (28% to 35% predicted probability) are in conflictive relations is much lower than the baseline probability of other stakeholder categories being in conflict (54% to 57%). Moreover, in the trust network the probability of having a medium to highly trustful relation between two municipalities increases compared to the baseline of two other stakeholder categories having a medium or highly trustful relation (43% to 46%). If one of the two actors is a municipality, the probability to share such a trustful relation increases to 62% (to 71%). This underlines the argument that municipalities tend to reduce conflict and increase trust in WE-implementation arrangements in Switzerland.

What about the probabilities of ties between cantons, developers and opponent NGOs? In the collaboration network, two non-developers collaborating show a baseline probability of 45% to 48%. A developer and an actor from a different main stakeholder category have a probability of 61% to 69% to collaborate. At 62% to 68%, a canton has a comparable probability of forming a collaboration tie with another category stakeholder. The opposite is the case for NGO opponents, compared to the baseline of collaboration of two other category players of 45% to 48%. An opponent NGO and a different main category stakeholder have a starkly lower predicted probability to have a collaborative tie, amounting to 8% to 15% only. In short, whereas cantons and municipalities have a higher probability to collaborate with organizations of other main stakeholder categories, opponent NGOs are less likely to collaborate intensely with other main category stakeholders.

In the conflict and trust networks, a different picture emerges: Developers do not have a higher probability to be in conflict or in trustful relations than the other main categories. Cantons only show a significant impact on trustful tie formation, but not for conflict: Where actors of other stakeholder categories have a baseline for sharing a trustful tie of 43% to 46%, a canton and another category player have a probability of a trust tie of 56% to 60%. Opponent NGOs also show significant effects regarding their probability to share a trust tie with other stakeholder categories. Whereas the baseline between other categories is again at 43% to 46% for such a tie, an opponent NGO is unlikely to show a trustful relation with a player from a different main category, as this probability is only at 3% to 9%. In contrast to developers and cantons, opponent NGOs also have a significantly higher probability to be in conflict with stakeholders from other categories: The baseline probability for two other category actors to share a conflictive tie is at 54% to 57%. In comparison, a conflict tie is 90% to 96% likely between opponent NGOs and a different main category actor. Thus, municipalities and cantons are likely to be sources of trust, whereas NGO opponents represent sources of conflict and mistrust.

6.3.4. Comparing and interpreting results

Results of the non-mediated automated regression analyses have shown that decentralization is associated with an increase in the number of organizations, the number of veto players, higher density in the collaboration network of the implementation arrangement and higher collaboration intensity. Results of the mediation models have shown that a higher number of organizations and veto players due to perceived local autonomy have a negative effect on agreement and trust. Perceived local autonomy has been shown to be a bad mediator for a cultural explanation of a French-speaking host-municipality with regards to agreement and trust. In the ERGMs, decentralization has been shown to not play a role. An implementation arrangement being in a more decentralized setting than in a more centralized one makes no significant difference for the probability of a collaboration, conflict or trust tie between categories of actors.

At first glance, non-mediated and ERGM results do not seem to overlap: The non-mediated results show an increase in intensity of collaboration and in density of collaboration due to some aspects of decentralization, while the ERGMs show that decentralization does not matter for the probability of forming a collaborative, conflict or trust tie. But at a second glance this is only contradictory for the concrete measures of cantonal decentralization and representational decentralization increasing the density of collaboration in implementation arrangements. This effect is not visible in ERGMs. Nevertheless, the contradiction for these two specific measures and collaboration density calls for resolution: The author argues that the ERGM's small main category network models, in which there is a very high probability already to collaborate, because only the central categories of actors are represented, are much less suitable to explain density than the results from the linear regressions. In fact, the linear regression finding presents a much more comprehensive test based on real-life-sized implementation arrangements. Moreover, the seeming contradiction can also be materially interpreted: It is likely that decentralization does not push for greater density within main category stakeholders but between main category stakeholders and others or only between others. Given the results and the two approaches' different setup, such an explanation seems highly likely.

Importantly, ERGMs do not make a claim about the intensity of collaboration (they are binary networks, explaining the probability of existence of a tie, not its intensity). Thus the finding from non-mediated regression about collaboration intensity can stand and be interpreted as it is: Various components of decentralization show a positive effect on the intensity of collaboration, none finds a negative one. How does this matter? For one, these results serve as an important reminder that an implementation arrangement acting in more decentralized settings does not mean that they must necessarily act more autonomously. In contrast, the findings show that enlarged relative municipal powers go hand in hand with an increased need for collaboration in implementation for the case of WE-implementation arrangements in Switzerland. Of course, the case of WE-authorization procedures might not be typical for Switzerland given the size of the arrangements, the duration of the procedure and the political saliency of the topic. Nevertheless, the example is important by its own right and because it can clearly falsify the implicit expectation in

Table 6.2: Decentralization effects on implementation arrangement aspects.

IV/Treatment(T)/ Mediator(M): Decentralization	**Analytical category of DV**	**DV: Implementation arrangement aspect**	**Est./ ACME/ Prob.**
Non-mediated regression analyses			
Cantonal dec.*	MOI**	Collab.*** density	0.04
	MOI	Collab. intensity	0.05
Polity: Perceived local autonomy (2017)	AC****	No. of organizations	0.88
	AC	No. of veto players	0.71
Policy: Fiscal dec.	MOI	Collab. intensity	0.005
Policy: Personnel dec.	MOI	Collab. intensity	0.003
Policy: Municipal expenditure as fraction of cantonal expenditure	MOI	Collab. intensity	0.004
Policy: Municipal income as fraction of cantonal income	MOI	Collab. intensity	0.004
Politics: Representational dec.	MOI	Collab. density	0.29
Politics: Direct-democratic dec.	MOI	Collab. intensity	0.02
Mediation regression analysis			
T: Polity: Perceived local autonomy (2017); M:	AC	Agree-c. int. *****	Neg.
No. of organizations, No. of veto players	AC	Trust-m. int. ******	Neg.
T: French-speaking;	AC	Agree.-c. int.	Neg.
M: Polity: Perceived local autonomy (2017)	AC	Trust-m. int.	Neg.
ERGMs			
All dec. components	AC/MOI	All DVs	Null

Notes: * “Dec.” is short for “decentralization”. ** “MOI” is an abbreviation of “mode of interaction”. *** “Collab.” stands for “collaboration”. **** “AC” is an abbreviation of “actor constellation”. ***** “Agree.-c. int.” stands for “agreement-conflict intensity”.****** “Trust-m. int.” is short for “trust-mistrust intensity”.

the decentralization literature that actors in decentralized settings "do their own thing". Rather the opposite is the case.

What does the link between decentralization and collaboration density and intensity consist of? The data show that greater municipal powers, greater relative autonomy and higher municipal co-decision powers on the cantonal level require also greater collaboration. The more tasks that municipalities must fulfill, the more they are likely to depend on outside expertise, thus leading to a proliferation of implementation arrangement size and more intense collaboration ties with federal agencies. In the ERGM models it was found that municipalities do not have a higher probability to collaborate with other main category stakeholders than other main category stakeholders (developers, cantons, opponent NGOs). Materially interpreted, this means that the increase of collaboration density and intensity due to a higher number of veto players and a higher number of organizations must stem predominantly from municipalities interacting with non-main category stakeholders (federal agencies, proponent NGOs, mandatee companies).

In non-mediated models, the number of organizations and the number of veto players are positively correlated with perceived local autonomy. Additionally, the number of organizations and veto players shows robust effects on two aspects of actor constellations: agreement/conflict and trust/mistrust intensity. The small but positive effect of the number of organizations on greater agreement and greater trust stands out, whereas a higher number of veto player reduces agreement and trust with a much higher magnitude (factor 3–5). Because of the small magnitude of the number of organizations, one should drop this finding because it is almost negligible in size. Moreover, the mediation analysis has not been able to corroborate a positive finding of the number of organizations, detecting a strong negative and robust effect on agreement and trust instead. If the number of organizations is used as a mediator, agreement and trust is strongly reduced (ACME and mediator effects are negative). Given its mediator role (as suggested by the high mediated proportion), mediation results are much more convincing than those from the linear regressions. Thus, it is suggested to interpret the effect of the number of organizations on agreement and trust negatively. Effects of the number of veto players have been much less equivocal: The mediation analyses have been able to corroborate the strong negative effects of the number of veto players on agreement and trust in the linear regressions.

Perceived local autonomy was also investigated as a mediator using the cultural factor of a municipality being French-speaking (dummy) as a treatment.

This mediation model was estimated because Mueller (2015) argued that the Latin vs. Alemannic cultural divide was the major reason that explained cantonal decentralization. On one hand, the model showed that perceived local autonomy is a "bad" mediator for a cultural treatment, but it also further confirmed the significance of a negative relation of perceived local autonomy with agreement/conflict intensity. For trust/mistrust intensity, perceived local autonomy does not present an important causal path (ACME), although the mediator's effect on trust/mistrust remains significantly negative. Overall, hence, perceived local autonomy (and other polity decentralization measures) present a "bad" mediator (proportion mediated low) with a cultural treatment. Perceived local autonomy itself is a strong treatment: It has a strong effect on the proliferation of the number of organizations involved in an implementation arrangement and on its veto players. In turn, the number of organizations and veto players diminish agreement and trust. Hence, indirectly, perceived local autonomy does lead to a reduction in agreement and trust in WE-implementation arrangements in Switzerland.

Besides the significant and materially important effects, it is equally important to speak about those effects that have either *not* shown up as significant or were materially weakly-sized. Among the more surprising findings in this regard is that decentralization has been shown to only lead to small direct changes in agreement/conflict and trust/mistrust intensity, if any (mediation models detect small effects, while in the linear regressions the effect did not pass the reporting threshold). Furthermore, there has not been an effect of decentralization measures on betweenness centrality. Individual organizations in implementation arrangements in more decentralized settings are not in better positions to act as a "bridge" between parts of the arrangement. Neither does decentralization impact the reputational power of those involved. Municipalities with relative high powers in more decentralized settings are thus not attributed more reputational power than municipalities in more centralized settings. The only valid predictor of reputational power is the category of an organization: Dummies of cantons, municipalities, developers and opponent NGOs explain almost all the variance in models with reputational power as a dependent variable. Table 6.2 summarizes all findings concerning decentralization effects on implementation arrangements.

What are the main takeaways from this investigation into decentralization effects on aspects of implementation arrangements? The most important finding is that perceived local autonomy, a measure of Mueller's polity dimension of decentralization, has been found to be positively associated with a proliferation of organization and veto player numbers. These, in turn, are negatively related to agreement and trust. Furthermore, many measures of decentralization are positively correlated with collaboration intensity and density, where greater decentralization is unequivocally associated with higher density and higher intensity. This suggests that decentralization furthers collaboration instead of diminishing it. Examining this finding more in-depth, it was found that municipalities are likely to increase their collaboration with non-main category stakeholders due to more decentralization. Non-main category stakeholders include mandatee organizations, federal agencies or proponent NGOs, among others.

6.4. Political party effects

This study's analytical model assumes that implementation arrangements are shaped by political parties understood as contextual actors. They are expected to have effects on implementation arrangements contingent upon institutional, cultural, geographic, demographic, economic, decentralization and sectoral/policy-control variables (see figure 2.2). Like for the previous section on decentralization effects, this section will present findings of the partisan effects following the order of the applied method. First, results of the non-mediated models are presented, followed by findings of mediation models and of ERGMs. As was the case for the decentralization variables, results of the non-mediated models served as leads for the other two modeling approaches. The section (and this chapter) closes with a comparative results discussion and interpretation.

6.4.1. In non-mediated models

In the linear regression models, three robust effects could be detected, all of them on actor constellation characteristics of implementation arrangements. The data were taken from Vatter et al. (2020) and averaged for the period 2000–2018. First, the fraction of left-party seats (sum of GPS, SP) in cantonal parliaments is negatively associated with the intensity of agreement. This means that left parties in cantonal parliaments are associated with higher (more intense) conflict in implementation arrangements. The magnitude of the effect is large: For every percent in increase of left-party seats, 1/7 of the SD in agreement intensity is lost. A 10% increase (roughly 1/5 of the empirically observed range) is associated with a decrease of 1.42 SD of agreement intensity. Similar in magnitude, a higher fraction of left parties in cantonal parliaments is also associated with a decline in the trust intensity in implementation arrangements. The effect is even slightly larger, with roughly 2 SD decline in trust for a 10% increase in left-party parliamentary fraction.

A second partisan effect shows the opposite direction: The fraction of left parties in cantonal executives is associated with an increase in agreement and an increase in trust. Effect magnitudes for the increase in agreement are slightly smaller than the negative effect of parliamentary fractions, but they are still meaningfully large: A 10% increase in left-party fraction of the cantonal executives is associated with an increase of 0.71 SD in agreement intensity and a 1.72 SD increase of trust intensity. The third partisan effect is also large in magnitude but slightly smaller than the two above: The measure of ideological spread (ordinal, 1–3, 1 = least spread) in cantonal executives shows a decrease of agreement intensity by -0.36 points or 1.28 SD for every single point increase (1/2 of the empirically observed range) in ideological spread in cantonal executives and a -0.23 or 1.26 SD decrease in trust.

The findings are to be interpreted in the context of a marked increase in polarization of Swiss party systems since the end of the Cold War (Vatter 2020; Bailer and Bütikofer 2015; Traber 2015; Kriesi 2015; Bochsler and Bousbah 2015; Sciarini et al. 2015; Traber 2015). Such changes have made the (renewed) detection of a partisan effect more likely. On the cantonal level, even though competition has increased for governmental seats, consociationalism is still very much alive and all-party government formulas are still the norm (Bochsler and Bousbah 2015). Between 2000–2018 on average, in only two cantons did the left parties hold a majority of seats in the cantonal executive (NE, BS); in all others, center and right parties have dominated (Vatter et al. 2020a). Given the still predominant consensual decision-making style of cantonal governments (Vatter 2020, 537), results show that the integration of a stronger left in the cantonal executives is beneficial for greater trust and agreement in WE-implementation arrangements. This integration is likely provided by a stronger center party, because greater polarization, meaning greater shares of left and right parties in the cantonal government (as measured by ideological spread), was shown to have a negative effect on trust and agreement in implementation arrangements. This shows — and confirms Bochsler and Bousbah (2015) — that there are boundaries to possible integration due to extended polarization. Hence, both measures suggest a “tempering” or even a positive role of center parties. Regarding effects of left parties in cantonal parliaments, however, these have been shown to have a negative effect. This is explained as follows: As there is not extensive consensus-seeking in cantonal parliaments, no overly grand decision-coalition is sought after, and a stronger left in parliaments, through driving up planning requirements by legislation (see further below and section 10.1.2.), has a negative effect on trust and agreement intensity in implementation arrangements.

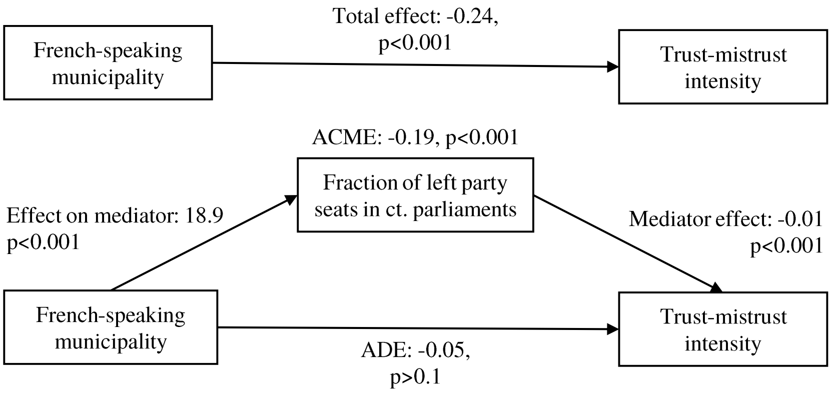
While these first results are promising, they must further be confirmed by mediation analyses, as these three measures are likely to be mediators as well: Politicians as mediators are understood as taking up and transforming institutional and other information. The outcomes of their work are then expected to feed into the functioning of the implementation arrangement. Thus, it needs to be checked to which extent these partisan effects remain standing in mediation analyses.

6.4.2. In mediation models

Political parties are theoretically likely mediators, their voteshare and seats being a result of many institutional and other contextual factors, while also impacting implementation arrangements through their political actions. In a series of mediation models it was tested whether being a French-speaking municipality might be subject to partisan mediation paths on agreement/conflict and trust/mistrust intensity. To recap: A first analysis of non-mediated effects of partisan determinants showed that a higher fraction of left-party members in cantonal parliaments and a higher ideological spread in cantonal executives lead to greater conflict and greater mistrust. A higher fraction of left-party members in cantonal executives has been associated with greater agreement and trust.

Looking at a mediation model using a French-speaking municipality dummy as a treatment and the fraction of left-party seats in cantonal parliaments as a mediator, the negative impact of left-party seat share in cantonal parliaments can be corroborated. Figure 6.6 depicts the model. It shows a total effect of -0.24 intensity points (0.85 SD) reduction in trust, an insignificant ADE, a highly significant and large effect size of the ACME and a very high proportion mediated of 0.79. The mediator thus captures a very important part of the negative total effect to the extent that a direct effect from a French-speaking municipality to the trust/mistrust intensity has become indistinguishable from zero. This strongly relativizes a cultural argument of the Romandie providing more mistrust, as it is left-party seats in parliaments

Figure 6.6: Mediation model using a municipality's French-language as a dummy treatment, the fraction of left-party cantonal parliament seats as a mediator and trust/mistrust intensity as a dependent variable.



Notes: Proportion mediated is 0.79. Control variables included in the model were the number of municipal inhabitants (2017, source: BFS 2019), the project advancement stage (source: PCS), the energy harvesting potential from wind by canton (source: ARE 2020a) and how many projects the canton hosts in total (source: PCS).

in the Romandie that absorb almost the entirety of the "cultural effect". If the dependent variable is exchanged with agreement/conflict intensity, the sign and significance of relations are the same and effect magnitudes are similar.

When using the fraction of left-party cantonal executive members as a mediator, the positive finding of the linear regressions of the left-party share in cantonal executives on agreement and trust intensity is inverted (not pictured): On agreement/conflict intensity, the ACME, the ADE and the total effect are negative and significant. For the dependent variable of trust/mistrust, the ACME is insignificant, but the ADE and total effect are significantly negative. Materially interpreted, this means that the mediation path over the fraction of left-party cantonal executives is only relevant for agreement/conflict and not for trust/mistrust intensity. but it also points to the fact that the relation is not very robust. For agreement/conflict, the proportion mediated is also very large, showing a magnitude of 0.71, while for trust/mistrust it is not interpretable.

Regarding the ideological spread in the cantonal executives, the linear regression has detected a strongly negative relation on agreement/conflict intensity. The mediation model (not depicted) using this variable as a mediator can also corroborate these relations with a negative total effect, a negative ACME and a negative ADE. The proportion mediated is only 15% through the mediator path, though. This demonstrates that this mediation path is a "bad" one. Contrary to above, this suggests a cultural driver rather than one due to genuine partisan polarization in cantonal executives. When exchanging dependent variables, then the entire ACME becomes insignificant, showing that the ideological spread does not fit as a mediator for trust/mistrust intensity. Interpreted materially, this means that the ideological spread shows no mediation effect on trust/mistrust intensity.

6.4.3. In exponential random graph models (ERGMs)

The study further tested to which extent the three partisan variables might be furthering or hindering the probability of having a collaborative, conflictive or trustful tie. Concerning the ideological spread, no connection between partisan variables and the probability of main category stakeholders sharing a tie in an implementation arrangement could be found. Regarding the left-party shares in both cantonal parliaments and cantonal executives, a small but still meaningful-sized effect of these two variables on the probability of main category stakeholders being in conflict was found. In detail: The probability of two main category stakeholders being in conflict increases with an increased fraction of left parties in the cantonal executive and in the cantonal parliament. If the fraction of left parties in the cantonal executive is minimal, the probability that main category stakeholders of two different categories are in conflict is between 79% and 100% (mean: 97%, SD: 7%). If the cantonal executive contains a maximal fraction of "left" parties, the probability for two nodes to be in conflict increases to 99% to 100% (mean: 100%, SD: 0.4%). The effect, magnitude and direction are very similar in size for the fraction of left parties in cantonal parliaments. The effects are not detectable for trust/mistrust intensity, however.

These results should now be squared with the results of the other two methods. The next section presents a comparison of results and suggests interpretations.

6.4.4. Comparing and interpreting results

The non-mediated and mediated analyses using political parties as independent variable, treatment or mediator, together with the results from the ERGMs, have resulted in a diversified overall picture, containing some contradictions. It is high time to resolve them. Table 6.3 summarizes the results based on the three estimation methods.

The measure of the fraction of left-party seat shares in cantonal parliaments shall be discussed first. In the non-mediated models it was associated with a reduction of agreement and trust. The mediation analysis using the fraction of left-party seats in parliament as mediator corroborated this result for both a decline in agreement and a reduction of trust. Indeed, the mediator is highly relevant, as it captures 4/5 of the cultural effect of greater conflict and mistrust as a result of being a French-speaking host municipality, making the remaining direct effect insignificant. Hence, the mediation results show that the parliamentary variable fully absorbs the cultural effect. The ERGM-models showed an increase of conflict (a reduction of agreement) and an insignificant effect on the probability of having a trustful tie in an implementation arrangement. The findings of all three methods overlap for agreement/conflict intensity but not fully for trust/mistrust intensity. Given the different network sizes of the different measures, this result must be interpreted dependent on the size of the implementation arrangement: For real, life-sized networks, the fraction of left-party seats in cantonal parliaments has been shown to bring a reduction of agreement and trust in implementation arrangements. For the main category stakeholders within these arrangements, only agreement is reduced, but not trust as an effect of this partisan variable. In view of the reductive smallness of the ERGM-networks, this realistically does not present a strong limitation of interpretation.

Concerning the partisan variable of the fraction of left-party executives, the linear-regression results showed a positive relation with agreement and trust. The mediation analysis that uses this variable as a mediator presents a viable path, where a high proportion of the cultural effect (Romandie) is mediated by it. However, the mediator effect (and the ACME) showed a negative sign, indicating that the fraction of left-party executives reduces agreement. Yet the variable is only a significant mediator to explain agreement/conflict and does not fit as a mediator for the dependent variable of trust/mistrust intensity. The ERGM results show a negative effect on agreement but no effect on trust. Thus, effects of the fraction of left-party cantonal executives on agreement/conflict are present in all three estimation approaches, but they point in different directions. Overall, these results point in different directions for agreement and are not robust with regard to trust. Hence, one must discard the effect of further consideration and depart from a null effect of left-party executive share on implementation arrangement trust and agreement.

With regard to the measure of ideological spread in cantonal executives, the modeling procedure in this chapter has also led to results that differ in sign: In linear regressions, the measure was found to have a negative effect on agreement and trust. When it is used as a mediator together with the Romandie-dummy as a treatment, the results show a strongly negative effect on agreement intensity, but they also show that this mediation path barely has any mediation power. The effect of ideological spread is only significant for the dependent variable of agreement/conflict intensity, not for trust/mistrust. Thus, the variable's "bad fit" as a mediator must lead to dropping the variable as a mediator. In the ERGM-models, no effect of ideological spread on either conflict or trust could be found. Coupled with the null-finding of the ERGMs models, the varied effects of this variable have not shown to be robust enough and shall therefore be discarded as an overall determinant of agreement or trust in implementation arrangements.

Hence, the study is left with the consistent negative effect of left-party seats in cantonal parliaments on trust and agreement in WE-implementation arrangements in Switzerland. But what could an explanation for these correlations be? I shall first take a step back: The literature on the politics of renewable energy (RE) suggests that left parties tend to be more favorable to RE-deployment than center and right parties (see Vuichard et al. 2019; Cousse et al. 2020 and section 4.4.). This would mean that the WE-friendliness of parliaments is assumed to be higher if there is a greater fraction of left parties. These parties would favor an improvement of conditions for WE-implementation.

Empirically, the opposite has been found: The study showed a higher conflict in implementation arrangements if there are higher fractions of left parties in cantonal parliaments. Thus, cantonal parliaments with higher left-party fractions produce legislation that creates stronger conflicts and less trust in implementation arrangements. There are two likely interpretations: First, departing from the assumption that higher seat shares make it possible to leave greater partisan imprints on cantonal legislation, these stronger imprints represent sources of added conflict for implementation. This would also mean that the left in cantonal parliaments is empirically *against* WE-development in Switzerland. A second interpretation is based on the debate on legislative

Table 6.3: Partisan effects on implementation arrangement aspects.

IV/Treatment(T)/ Mediator(M): Decentralization	**Analytical category of DV**	**DV: Implementation arrangement aspect**	**Est./ ACME/ Prob.**
Non-mediated regression analyses			
Fraction of left-party seats in cantonal parliaments	AC*	Agree.-c. int.**	-0.04
	AC	Trust-m. int.***	-0.06
Ideological spread within cantonal executives	AC	Agree.-c. int.	-0.36
	AC	Trust-m. int.	-0.23
Fraction of left-party seats in cantonal executives	AC	Agree.-c. int.	0.01
	AC	Trust-m. int.	0.05
Mediation regression analysis			
T: French-speaking; M: Fraction of left-party seats in cantonal parliaments	AC	Agree-c. int.	Neg.
	AC	Trust-m. int.	Neg.
T: French-speaking; M: Ideological spread within cantonal executives	AC	Agree-c. int.	Neg.
T: French-speaking; M: Fraction of left-party seats in cantonal executives	AC	Agree-c. int.	Neg.
ERGMs			
Fraction of left-party seats in cantonal parliaments	AC	Exist. of a. tie****	Neg.
Fraction of left-party seats in cantonal executives	AC	Exist. of a. tie	Neg.

Notes: * “AC” is an abbreviation of “actor constellation”. ** “Agree.-c. int.” stands for “agreement-conflict intensity”. *** “Trust-m. int.” is short for “trust-mistrust intensity”. **** “Exist. of a. tie” spelled out is “existence of agreement tie”.

effects of greater polarization that has been observed in Swiss politics since the end of the Cold War (Vatter 2020; Traber 2015; Kriesi 2015; Bochsler and Bousbah 2015; Sciarini et al. 2015). If one assumes that a stronger left increases polarization (if it is to the detriment of the center party), then it is arguably more difficult to reach common ground to adopt legislation, making minimal common denominators the only possibility. This, in turn, is likely to displace existing conflict from the parliamentary to the implementation arena.

Most clearly, however, the literature's current tenet of left-party WE-friendliness cannot be supported. In fact, the findings suggest the inverse, with higher left-party fractions in cantonal parliaments increasing conflicts in implementation arrangements. Moreover, they hint towards a novel research question investigating how and why party polarization may represent a source of implementation conflict.

Chapter 7: Link 2: Implementation arrangement effects on problem-solving effectiveness

At this point in the study, the second part of the research question, which asks how implementation arrangements affect the PSE of public decision-making in WE-authorization procedures in Switzerland, will be answered. Figure 7.1 presents the chapter's analytical focus and position within the full analytical model of this study (see chapter 2). The "intermediary" variables of implementation arrangement aspects are treated as independent variables, and outcomes of PSE serve as dependent variables.

The chapter follows the following structure: First, in section 7.1., the data collection and modeling strategies are presented, which equips the reader with understanding how results were generated. Thereafter, in sections 7.2. and 7.3., the chapter's DVs are presented and put in relation to each other, followed by an overview over the measures of IVs used. Then, results of models of efficiency are presented, using the first PSE-measure, in section 7.4. This is followed by the display of results for models of stakeholder-rated efficacy, a second PSE-measure, in section 7.5. A final section (7.6.) compares and interprets results.

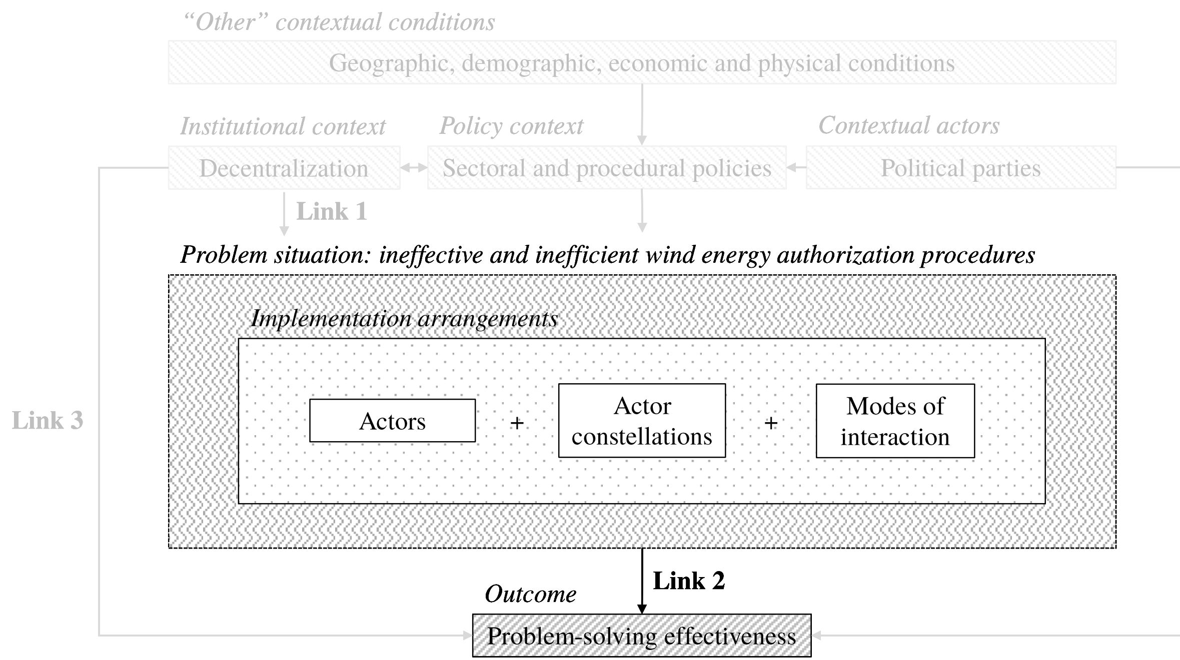
7.1. Methods and data

The purpose of this section is to convey how the data were collected, what estimation strategy was applied and what robustness measures were taken. It proceeds in this order.

7.1.1. The Project Characteristics Survey (PCS)

The data that are used to model answers for this chapter are drawn from the Project Characteristics Survey (PCS) and the NCS. Details on the NCS were given in section 6.1.1.; therefore, only the PCS will be described here. The PCS was conducted between April 2020 and February 2021. As the name states, the survey inquired about details (stages, dates, procedural aspects) about the authorization procedure of each WE-project. 317 questionnaires

Figure 7.1: Chapter 7 focus in the present study's analytical model.



Notes: Analytical categories indicated by rectangular boxes with different shading per category, labels in italics, material content in regular font, links of correlational association in bold font; grayed out is what is out of focus in this chapter.

were sent to 187 organizations divided into four stakeholder categories, namely municipalities (n = 121), federal agencies (n = 5), cantons (n = 17) and developers (n = 44).[211] The project organization (n = 317) was defined as the unit of the population. Stakeholders were involved in a total of 85 different projects. The survey was designed as a population survey (census or inventory), not a sample-based one. Each of the four mentioned stakeholder groups received different questions. The questionnaires were available in German, French or Italian and could be filled in using a PDF form or an excel document. The project population had initially been identified based on Swisstopo's (2020) map layer of WE-turbines, followed by a more detailed inventory based on a map called "Windparkkarte" managed by several Swiss environmental and heritage protection organizations (SL Schweiz et al. 2020). To identify advancement statues, based on which different versions of the survey were sent out, the study used archived newspaper reports from Swissdox (2022) and from the Swiss National Library (2020) and contacted the relevant people by e-mail in case newspaper reports were inconclusive. In total, 20 versions of questionnaires (by stakeholders, advancement status, language) were distributed.[212]

All respondents received a postal invitation letter that presented the project and told respondents that they were to receive the necessary documents in the weeks to follow by e-mail. The survey was then conducted via e-mail, with a non-negligible amount of verification and support-phone calls.[213] Because

211 Importantly, these do not correspond to the main stakeholder categories of the NCS used for the ERGMs.

212 For the Italian-speaking ones, only four versions were necessary, not eight as for the other two languages. For each project, the cantons received one of two versions: one for projects that had not yet received construction permission and the other for those that had. Developers received one of four different versions in order of advancement: Either a project had not been fixed in the CSP, it had not yet received the LLUP-accordance, it had not been granted the building and operation permit or, finally, it had already received the latter. For the smaller questionnaires for municipalities and federal agencies, no differentiation by phase of advancement was made, because this was not needed.

213 Feedback tended to be positive, but not throughout. Unfortunately, again, the author received threatening (postal) letters and e-mails explaining bewilderment and anger. These letters and messages showcased deep-rooted skepticism about WE in Switzerland, but also about science and industrial development more generally. Often, these messages asserted that the present research project was being funded by Suisse Eole, the Swiss wind energy industry association, which the project is not. Moreover, a frequent theme was that I could not "pretend" that my project be "scientific", or impartial, two claims that I make and continue to fully uphold. This

the start of this survey coincided with the start of the first Swiss lockdown due to the coronavirus pandemic and returns were minimal at the beginning, the survey was relaunched in June 2020, which proved to be much more effective. Individual reminders were sent in September and November 2020 and January 2021. Concluding the survey with many calls and reminders in February 2021, a response rate of 62.5%[214] was achieved.

All 17 WE-cantons, except AI and TI, host multiple numbers of projects.[215] Hence, these multiple hosts received multiple questionnaires. VD, the canton with the highest number of projects in Switzerland (n = 13), and the closely following cantons of BE (n = 12) and VS (n = 10) thus received the survey for 10–13 projects of different advancement phases. Larger developers, like Greenwatt, received the survey for six projects, again of different advancement phases. There are also some municipalities that host more than one project (e.g. Obergoms). For most cantons, many developers and some more invested municipalities, answering the survey required a substantial time investment and maybe some consultation of old documents. To combat the substantial investment of time required by multiple project hosts, the study offered financial compensation, but this had not been requested. On behalf of the project, the author had to sign several non-disclosure agreements guaranteeing that the raw data that was provided were not shared with anyone under any circumstances. The strictness of terms also led to needing to decline data offers, because in these cases the study could not have published even aggregate data, making their collection scientifically useless.

7.1.2. Modeling strategy

To test link 2, as is the purpose of this chapter, i.e. the association between implementation arrangement aspects and PSE, an empirical strategy was built

further illustrates claims from the interviews about the coarseness of the debate (see section 5.4.4.).

214 Following the modalities of response rate 2 of the AAPOR 2016.

215 The project definition is repeated for convenience: To be included, a WE-project either had to be of a “standard” or “low-capacity” type (see section 5.2.2.) and must have received its met mast authorization between 01.01.1998–31.12.2018. The observed range of time for duration is 01.01.1998–31.12.2021. For early projects, the additional condition was formulated that cantonal pre-planning in cantonal structure plans is not sufficient; at least, a developer must already be involved to count a perimeter as a project.

based on the statistical modeling of two measures of PSE, namely efficiency as duration in months (n = 85 projects) and efficacy as judged by stakeholders (stakeholder-ratings, n = 30 projects), using five-point and three-point answer scales. The latter items on efficacy were then combined to a single factor using exploratory factor analysis.[216] For this chapter, two sets and two series of models were estimated. They test the different analytical categories given by the ACI. Sets and series are not the same, as will be clarified later. For now, it is important to explain what the two series are: A first series (7.1) regressed actor constellation and mode of interaction measures as IVs against efficiency and stakeholder efficacy ratings. A second series (7.2) assessed effects of actor orientations (AO) on stakeholder efficacy ratings and efficiency. The two stylized textual equations are the following:

The ACMOI-series, for actor constellations and modes of interaction effects on both measures of PSE:

$$E_k \longleftarrow AC_{kl}\ OR\ MOI_{kl} + cluster_{im\ OR\ j\ OR\ jm} + SPR_{ik\ OR\ jk} + PPR_{ik\ OR\ jk} \tag{7.1}$$

The AO-series, for actor orientation effects on both measures of PSE:

$$E_k \longleftarrow AO_k + cluster_{im\ OR\ j\ OR\ jm} \tag{7.2}$$

where:

AC = actor constellation variable
AO = actor orientation variable
E = efficiency or stakeholder efficacy ratings
i = canton
j = municipality
k = project
l = theme

MOI = mode of interaction variable
SPR = sectoral policy-rule variable
PPR = procedural policy-rule variable

216 To do this, I resorted to using the *efatools* (Steiner and Grieder 2020) package. All efficacy items were found to load on a single dimension that was then used as a DV and labeled “overall efficacy scores”.

As controls, the (7.1)- and (7.2)-series include clusters. In the ACMOI series (7.1), no AO-control variables were included because of the principle of declining abstraction used in the ACI (Lindenberg 1991). The two categories of policy-rule controls (SPR and PPR), included in the ACMOI-series as controls, have been inspired by Hall's "orders of institutional change" (1993). In consequence, the two categories of policy rules are differentiated by their "order of changeability", meaning the ease or difficulty which goes into changing them. Hence, sectoral policy rules (SPR) are seen as more deeply embedded policy principles in the relevant policy fields on which WE-authorizations build. Procedural policy rules (PPR), in turn, refer to more easily changeable policy rules and denote specific authorization rules that are specific to each WE-project. Thus, sectoral rules are more general-abstract, and procedural rules are more concrete-specific.

Regarding the control variable of clusters in both series, partisan and decentralization aspects were divided into three different clustering procedures. The first combines decentralization, partisan factors and geographic, demographic and economic controls, all on the municipal level. This has resulted in municipal clusters. The second and third are based on data on the cantonal level; the second comprises decentralization measures and the third partisan ones. These clustering efforts have resulted in a cantonal partisan clustering and a cantonal decentralization clustering. The clustering criteria are based on the results from the modeling of hosting probabilities reported on in chapter 8. There are seven clusters in the municipal clustering, two in the cantonal decentralization clustering and two in the cantonal partisan clustering.[217] All clustering proceedings and graphs are available upon request.

For both series, the study automated the estimation of survival models to evaluate efficiency as an aspect of PSE.[218] For the stakeholder efficacy rating

217 For all typologies, the Manhattan distance (the so-called "taxicab metric", Krause 1987) was used as a similarity measure. Thereafter, the software was instructed to use Ward's method to produce agglomerative hierarchical clusters based on minimizing total within-cluster variance (Ward 1963). The optimal number of clusters was then selected based on an algorithmic function that compares results of 30 selection metrics and reports the optimal few. To produce the clusters and the figures, the study relied upon the following packages in *R*: *[T]idyverse* (Wickham et al. 2019), *purrrlyr* (Henry 2020) for data handling, *cluster* (Maechler et al. 2021) and *NbClust* (Charrad et al. 2014) to estimate clusters. For graphing, *ggdendro* (de Vries and Ripley 2020), *dendextend* (Galili 2015), *ggplot2* (Wickham 2016), *ggpubr* (Kassambara 2020) and *extrafont* (Chang 2014) were used.

218 I used the *survival* package (Therneau 2022) for estimation, *purrrlyr* (Henry 2020), *catchr* (Burchill 2021) and *tidyverse*(Wickham et al. 2019) for data and loop handling,

models, standard multiple linear regressions were employed.[219] A full list of variables is available upon request.[220]

For each series, the models estimated are combinations of all logical and possible variables of the given categories. To start with, models were estimated that include a single variable per analytical category (so-called "full" models). For the ACMOI series, this means that each of these models included one actor constellation or one mode-of-interaction variable, with every possible combination of controls. A second set of series was estimated thereafter, this time consisting only of all possible combinations of IVs of a single analytical category (labelled "internal" models), without incorporating controls. For both sets and series, all combinations were estimated, taking into account said restrictions. Each model was further constrained to containing 1–5 IVs for each DV. These results of survival and linear regression models were then interpreted as explained in the following.

As a reporting threshold and, thus, as a criterion of inclusion in the further treatment of model results, the threshold of significance of 0.1 or 10% for both efficiency and stakeholder-rating efficacy estimates was applied to both estimation series and sets. This may be criticized as being lower than conventional, but it may be argued that it makes sense because of the low number of maximal cases being 85. Most regressions, because there is missing data, include fewer cases. Moreover, a large majority of the project population in the study, it is designed to reflect the entire population, allowing the researcher to set the bar of significance lower. For the models that include fewer than these 85 cases, the assumption of missing-at-random needs to be maintained: In correlational tests, non-responses have not shown to be associated dependent variables of all sorts. Most concepts are tested using more than one measure: In at least three out of four, two out of three and two out of two measures that measured the same concept, the estimates needed to pass the 10%-threshold to be considered significant.

But having a significant concept estimate across its measures is not enough to pass the reporting threshold. There also needs to be a cut-off value of the percent of models in which the variable must be significant for each

---

and the *stats* (R Core Team 2013) package for data preparation in *R* (R Core Team 2022).

219 To estimate them, I resorted to standard packages in *R* (ibid.). For data handling and preparations, I resorted to the *tidyverse* (Wickham et al. 2019), *purrrlyr* (Henry 2020) and *stats* (R Core Team 2013) packages.

220 Table 7.4 gives an overview over the tested ACMOI-variables. Table C in the online appendix shows the AO-variables and how they load on which dimension.

measure of each concept: In other words, what is the percentage of models in which each measure of each concept under consideration must be significant, above which it may be regarded as materially important enough to report? These thresholds were defined by series, as each measure of each concept is tested the same number of times (before removal of erroneous models) in each series. The reporting threshold is only reached if the variable under consideration reaches it in both sets and for the defined number of necessary measures per concept. Logically, such a threshold must account for the number of models tested; it must be much higher for a lower number of tests. For the AO series (7.2), a 100%-threshold was defined as necessary. In this series, 1–3 models were calculated per explanatory variable, after erroneous models had been discarded. For the series focusing on actor constellations and modes of interaction, counting 239–394 models per explanatory variable after discarding erroneous models, the study decided to select a 60% reporting threshold. The reasoning behind the lower thresholds is that the higher number of variables tested in series (7.1) increases the number of possible combinations and thus of models calculated. Having a higher number of variables also increases the probability of having a strong detractor variable, whereas having fewer variables and models decreases it. When having many models, the reporting threshold can thus be legitimately lowered.

As the type of survival model, Cox-proportional hazard models (Cox 1972, 1975) were estimated. They make no assumptions about the functional form of the relation between independent and dependent variables (see, e.g., Mills 2011, ch. 5) and are thus very useful for the present study, where the functional form is unknown. The Efron method (1977) was applied in case of ties regarding the efficiency measure of duration in months in the data. The choice of modeling survival models was made in order to profit from the fact that duration in time units can be used as a DV and because such models can explicitly account for the "censoring" of data (Mills 2011, 1ff.). This accommodates studies that have late-coming drop-ins and early drop-outs. Not censoring could introduce bias in independent time- or duration-dependent IVs (ibid., 9ff.). Serving as an overview over the baseline survival curve, Kaplan-Meier (1958) estimates were further estimated.

For both sets (full and internal) and series (ACMOI and AO), the study will report on detractor variables. By the term of "detractors" the following is understood: The study checked the percentage of models in which the main variable remained significant if another IV of the same series was included. The study reports those IVs as detractors in which at least half of the estimated models, in which both the main variable and the potential detractor-IV were included, showed an insignificant main variable.[221] The detractors of the first estimation set are limited to variables of analytical categories that differ from those of the main variable. In contrast, the detractor reporting from the second set checked for detractors by looking at what happened to the main variable's significance if every other variable from the same analytical category in every combination entered the model. For both, independent variables that managed to make the main variable insignificant in at least 50% of models in which both were included are reported as detractors. Detractors from both sets will be reported and are labelled as "internal" (from the "internal" set) and "external" detractors (from the "full" set), respectively.

Table 7.1 summarizes the modeling strategy just discussed. It summarizes how many models were retained per series and DV after deleting all models that produced errors of even a non-critical sort. Regarding variable compatibility and goodness of fit, the survival models were more demanding than the linear regressions. A total of 1,201,765 models were estimated and are drawn upon to derive results. The very high number in the internal set is the result of opening up to models from a single to five independent variables. For the internal set and the ACMOI series, all possible combinations (not permutations) of 38 independent variables in 1-IV models to 5-IV models were estimated, resulting in 584,896 models (minus errors) for each dependent variable.[222] The full set estimations were much more restricted, even though they also modeled 1-IV to 5-IV models. This estimation approach was followed for both dependent variables of efficiency and stakeholder efficacy ratings.

Some further explanations when interpreting detractors are in order. There are two of their characteristics that are helpful to examine: First, detractors, just like main variables, may pass the reporting thresholds themselves. Second, they either correlate with the main independent variable (tested with Spearman's ρ (1904) to accommodate for non-normality) from which they detract, or they do not. If they correlate, they can be said to be associated directly with the main IV; if they do not, they must be indirectly impacting the main variable's significance on a PSE measure (effects of model specifi-

221 Note that the number of models in which both the main variable and the potential detractor are included represents only a fraction of the number of models in which the main variable is included. Only detractors to main variables that pass the reporting thresholds in both estimation sets for each series are analyzed and reported.

222 $38 + \binom{38}{2} + \binom{38}{3} + \binom{38}{4} + \binom{38}{5} = 584,934$ minus 38 erroneous models = 584,896.

cations are assumed to cancel each other out on average). Thus, detractors can be placed in a two-by-two table, as depicted in table 7.2.

Four possibilities result when combining the two detractor characteristics. Taking the bottom left cell as an example, the detractor may be correlated with the main variable and thus directly be in statistical association with it. This means that it directly impacts the significance of the main IV. In other words, this signifies that the detractor is a driver of the main variable or is driven by the main variable. Yet the detractor does not belong to the set of main variables that pass the threshold to count as a significant explainer of PSE, as detected by the method previously described, which is why this example-detractor only influences PSE indirectly by directly influencing or being influenced by the main variable. All detractors will be reported following this two-criteria interpretative scheme.

Some further explanations are needed regarding the depiction of PSE results in what follows hereafter. For efficiency, results of the survival models are depicted as survival curves. To graph the maximal and minimal hazard ratios (exponentiated regression coefficient) as a survival curve, the study selected both models with the most extreme magnitudes of the pool of models in which the graphed variable showed a minimal significance of $p < 0.05$. For model-fit assessment, the study further plotted included Cox-Snell (1968) and deviance residuals (Pregibon 1981). The proportional hazard assumption, and thus the appropriateness of applying Cox-models, is tested with the Cox-Snell residuals. The deviance residuals allow for the identification in that they show whether the event under consideration (receiving a construction permit) occurred earlier (positive) or later (negative) than the model would expect.

The stakeholder efficacy ratings graphs follow a similar graphing strategy: The graphs show the minimal, maximal and median slope of the variable under consideration drawn from the pool of models in which the main variable was significant at the level of $p < 0.05$. The variables that are reported graphically have reached the above-mentioned percentage threshold for the overall efficacy factor, not necessarily for its single components.[223]

223 Hence, it might be the case that the graphed results of the single components have not individually reached the reporting threshold of significance. All slopes shown are significant, however, minimally at $p < 0.05$.

Table 7.1: Summary of link 2 modeling strategy.

Group / DV	**Set**	**Series**	**No. of models estimated**
Estimated models			
Efficiency	Full	ACMOI	8,510
		AO	32
	Internal	ACMOI	576,005
		AO	6,884
Stakeholder ratings	Full	ACMOI	18,468
		AO	48
	Internal	ACMOI	584,934
		AO	6,884
Detractors to independent variables			
Of efficiency	External	ACMOI	Transformed model results
		AO	
	Internal	ACMOI	
		AO	
Of stakeholder efficacy ratings	External	ACMOI	
		AO	
	Internal	ACMOI	
		AO	
Total			1,201,765

Table 7.2: Two-by-two table of possible detractor interpretations.

		Correlation with main IV	
		Yes	*No*
Individual significance	*Yes*	• PSE: direct, • main IV: direct	• PSE: direct, • main IV: indirect
	No	• PSE: indirect • main IV: direct	• PSE: indirect • main IV: indirect

Notes: “PSE” is short for “problem-solving effectiveness”. “IV” stands for “independent variable”.

7.2. *Dependent variables: Measures of problem-solving effectiveness in comparison*

In the present chapter, two understandings of PSE are investigated: efficiency and stakeholder efficacy ratings. Efficiency measures the duration from the date of the met mast authorization (earliest possible time: 01.01.1998) to 31.12.2021 or to an earlier date at which the WE-project received a construction permit. Stakeholder efficacy ratings, as the name states, are evaluated by stakeholders themselves. Each rated the state of their project(s) by the criteria of perceived fairness, transparency, managerial competence, perceived efficiency[224] and general satisfaction with the authorization procedure. For the theoretic derivation of the measures and for their operationalization, see section 3.3.2.

In a first step, the study analyzed whether the two PSE measures correlate with each other and whether they really measure two different concepts and not a single latent variable. Table 7.3 shows these correlations. If the Shapiro-Wilks test (1965) indicated no difference to normality, Pearson’s r (1896) was used. If, however, the normality test indicated non-normality, Spearman’s ρ (1904) was applied, which is not based on the normality assumption. Overall, efficiency correlates negatively at a medium-sized (scale: Cohen 1988, 79–81) value of -0.35 with the stakeholder efficacy ratings factor, but it also negatively correlates with its fairness, perceived efficiency and competence components (at least at $p < 0.1$).

224 Perceived efficiency is not to be confused with efficiency as measured by duration.

Table 7.3: Correlation between indicators of efficiency and stakeholder efficacy ratings.

	Stakeholder ratings: factor	**Fairness**	**Transparency**	**Competence**	**Perceived efficiency**	**Satisfaction**
Duration (efficiency)	ρ: -0.354 p: 0.047	ρ: -0.354 p: 0.047	ρ: -0.241 p: 0.18	ρ: -0.324 p: 0.071	ρ: -0.473 p: 0.006	ρ: -0.243 p: 0.181
Stakeholder ratings: factor		ρ: 0.933 p: 0	ρ: 0.919 p: 0	ρ: 0.902 p: 0	ρ: 0.809 p: 0	ρ: 0.764 p: 0
Fairness			ρ: 0.893 p: 0	ρ: 0.738 p: 0	ρ: 0.735 p: 0	ρ: 0.639 p: 0
Transparency				r: 0.79 p: 0	r: 0.707 p: 0	r: 0.677 p: 0
Competence					ρ: 0.69 p: 0	ρ: 0.778 p: 0
Perceived efficiency						r: 0.626 p: 0

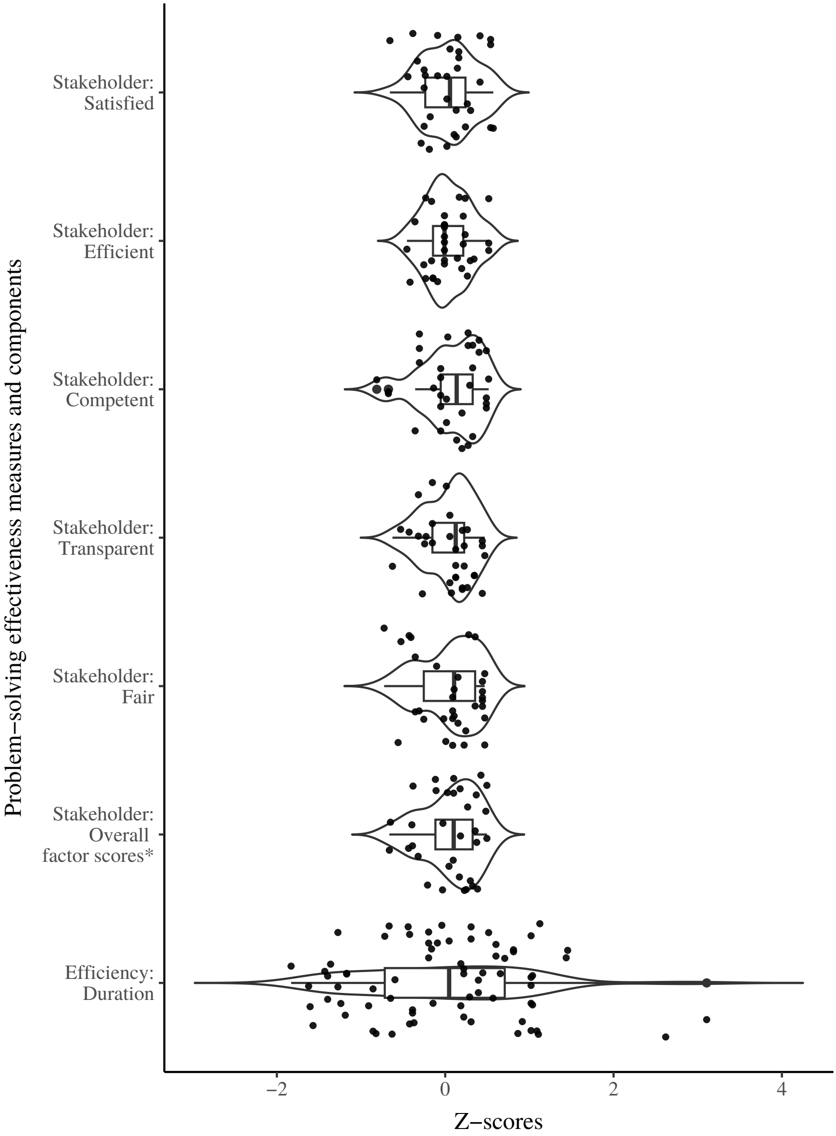
Notes: Correlations (Spearman's ρ or Pearson's r) and p-values (p) are indicated for the correlation pairs, following the Shapiro-Wilks (1965) test on normality.

Nevertheless, efficiency does not correlate significantly with the transparency and satisfaction ratings of efficacy. What is noteworthy, however, is that the measurement of efficiency as duration in months is negatively correlated with the (perceived) rating on efficiency as indicated by respondents. The ρ is also of medium size (following Cohen 1988, 79–81) and highly significant. Because duration is negative efficiency, there is actually a positive correlation between the two efficiencies: The "lower" the efficiency, the "lower" the perceived efficiency. This is to be expected. What is surprising, however, is that they correlate at what Cohen (ibid.) would not even label a "large" magnitude.

Overall, however, this medium-sized correlation is the highest empirically observed correlation between efficiency and stakeholder efficacy ratings. In consequence, one can clearly state that problem-solving efficiency and stakeholder efficacy ratings do not measure the same — or even a similar — latent concept. In turn, the correlation coefficients *between* the five stakeholder rating dimensions correlate very highly with each other (between 0.63 and 0.89), and all correlates are positive and significant. Hence, the procedure of aggregation into a single efficacy factor also makes statistical sense. Overall, the efficacy factor is sufficiently different from efficiency to speak of two different concepts, again not only in theory but also as observed empirically.

Next to correlations, the distribution of the used PSE measures should also be briefly examined. Figure 7.2 shows all of them, including the overall efficacy factor scores. The points indicate z-scores of means per WE-project, not individual ratings by stakeholders. What first meets the eye is that the efficiency measure (duration) has much larger deviations from the mean than all stakeholder rating components. The slightly positive median of the duration measure indicates that the median project has a slightly longer authorization procedure than the mean project. Moreover, very slightly positive medians are also visible for all stakeholder rating components and the factor scores. This goes to show that most projects are balanced with regard to countervailing forces within a project's ratings or that, put differently, every proponent has a more or less equally non-neutral opponent, for the overall project mean as depicted is close to 0. A positive median also shows that over 50% of the projects have a stakeholder efficacy factor rating mean above the sample mean. Thus, there are fewer consistently ineffectively/inefficiently rated WE-projects than there are WE-projects that are positively rated. The violin plot depicts a density estimator, indicating high probability of observing a point where it is broad and a small one where it is narrow. This can also be seen

Figure 7.2: The distribution of stakeholder ratings and efficiency measures in a combined violin- and box plot.



Notes: * The stakeholder: overall factor scores in the violin- and box plot present the overall factor scores based on a Thurstone (1934) regression that takes the five stakeholder rating components as its prediction elements.

Table 7.4: Independent variables tested in the analytical categories of actor constellations (AC) and modes of interaction (MOI).

Concepts	**Number of measurement alternatives**
Actor constellations (AC)	
Number of involved organizations	1
Number of veto players	1
Reputational power	4
Reputational power of opponent coalition	1
Reputational power of proponent coalition	1
Difference between reputational power of coalitions	1
Intensity of agreement/conflict	2
Intensity of trust/mistrust	2
Degree in agreement/conflict	2
Degree in trust/mistrust	3
Density of agreement/conflict	2
Density of trust/mistrust	4
Betweenness centrality in trust/mistrust	2
Modes of interaction (MOI)	
Intensity of collaboration	4
Degree in collaboration	2
Density of collaboration	4
Betweenness centrality in collaboration	2

Notes: The betweenness centrality of agreement/conflict led to estimation errors in survival models, which is why it was fully excluded.

by the highest densities of the violin plots, which are all at around 0 except for the PSE efficiency measure (duration) at the very bottom, which has a very slight highest density at around 1 point (= 1 SD, as they are z-scores).

7.3. Independent variables: An overview

There are plenty of IVs whose effects on efficiency and stakeholder efficacy ratings have been tested. They are of the categories of actor constellations (AC), of modes of interaction (MOI), together called ACMOI, and of actor orientations (AO). Table 7.4 shows the tested ACMOI concepts in overview. There are 17 ACMOI concepts and 38 measures of them. This means that for most concepts, multiple measures were resorted to.

Section 6.1.2. explained how these alternative measures of implementation arrangement aspects came about. In short: There are 18 specifications of each network concept or metric (intensity, density, degree, betweenness, reputational power; see glossary in the online appendix). For modeling, only those measures of these metrics/concepts were retained that promised highest reliability while containing the smallest amount of possible bias based on network boundary and validity considerations.[225] If there had not been reductions in alternative measures to a digestible amount, this exercise of measurement would have resulted in several thousand independent variables. For the non-network variables of the number of involved organizations and of veto players, there is only a single measure that was constructed. All data for these concepts stem from the NCS survey. Regarding the meaning of the individual concept, the reader is referred to chapter 6 and/or the online appendix.

Concerning the analytical category of actor orientations, the IVs contained the mean of stakeholder responses both per item and project, but it was also tested whether their aggregates, elicited through an exploratory factor analysis, made a difference. Table C in the online appendix lists the individual items and shows which item loaded on which aggregate. As their name states, the aggregated factors called full, core and secondary factors, as they result from a factor that incorporates either all ten individual items, the core items

225 Because the measures of betweenness centrality of agreement/conflict caused widespread errors in survival models, they were excluded from model estimations; so there are only measures of betweenness centrality for the collaboration and trust/mistrust themes.

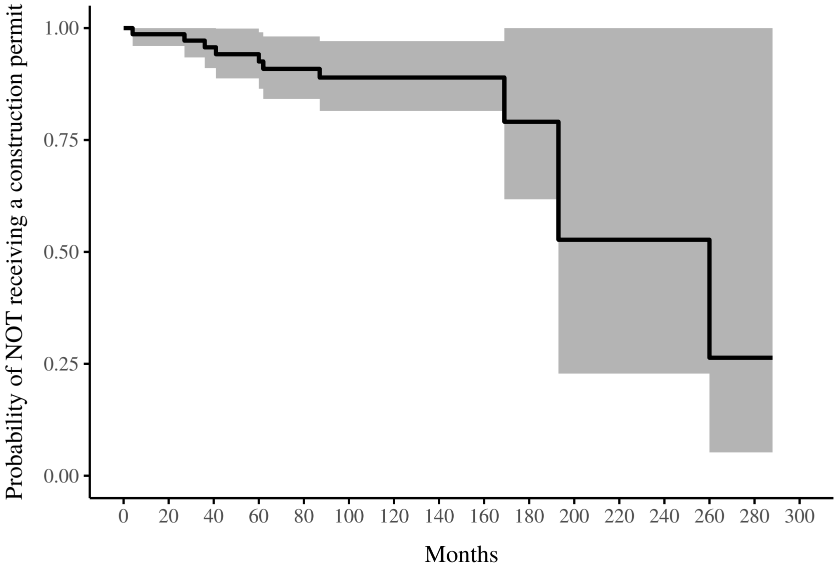
or the secondary items. Core items refer to deeper worldviews applied to the issue of WE in Switzerland, and secondary items ask about orientations towards particularities of WE-projects themselves (see section 5.6.2. for details). Coalition measures have only been calculated based on full scores for simplicity reasons. The proponent coalition measure took the mean by WE-project of all stakeholders that have a positive full factor score in a project. The opponent does the same thing with negative full factor scores. The measure on differences between mean actor orientations of opposing coalitions is the absolute value of the subtraction of the two coalitional measures per project. This is an important measure as it describes the mean polarization of stakeholders regarding orientations in each WE-project.

7.4. Results of efficiency models

As an introduction and to give an overview over the duration and probability of not receiving a construction permit, figure 7.3 shows an "empty" or "intercept-only" survival curve. This presents the situation of WE-authorization procedure duration as it is, without any covariates. It estimates the probability for the event — *not* receiving a final construction permit — using information from those that have already experienced the event and using information from those that are still at risk at each point in time. In figure 7.3, to put it positively, one can detect that the probability of receiving a permit only strongly increases between months 160 (13.3 years) and 260 (21.7 years). Shaded in gray are the 95%-confidence intervals. These show that it clearly remains in the realm of the possible that a project receives no final construction permit even after month 280. The large confidence interval is due to the fact that fewer data points are available for these very long durations. Without looking at project attributes and including all 85 projects (all planning phases), those ten projects that have received the final construction permit limit the explanatory force of the graph for reasons of statistical power. [226]

226 However, as this represents the population of WE-projects in Switzerland of the standard and low capacity types (see figure 5.1), the argument of statistical power must be regarded in this light. As will be seen later, the low number of events in the dataset will be the main vector of critique over statistical power of all estimated survival models. I argue that, as it reflects the population in models where data are missing-at-random, the findings are tenable. Their robustness is further proven by the reporting-threshold approach elaborated on in section 7.1.

Figure 7.3: Survival curve using Kaplan-Meier estimates for all strata (empty model).



Especially the increase in probability to receive a construction permit between 160 and 260 months will now serve as an evaluative reference for the models that gauge the effect of one or multiple covariates. The following subsections present the results of efficiency models by estimation series. First, the results of the ACMOI series (7.1) and then the results of the actor-orientation series (7.2) will be presented.

7.4.1. Actor constellations and modes of interaction

This section evaluates possible effects of actor constellation and mode-of-interaction aspects of implementation arrangements on the PSE measure of efficiency. The number of involved organizations, of veto players, the strength of reputational power, the difference in reputational power between coalitions, and trust density and intensity have shown to have significant and robust effects on efficiency. They will be discussed in turn.

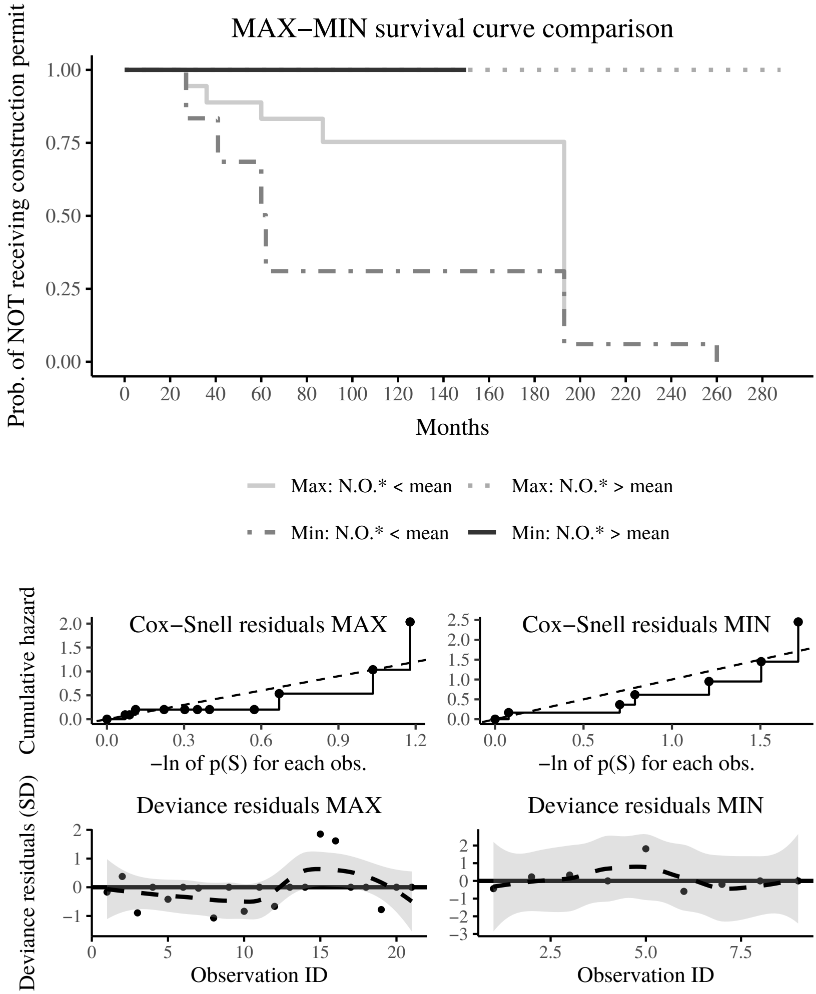
The number of involved organizations

How many organizations partake in a WE-implementation arrangement has been found to robustly and negatively impact efficiency. Figure 7.4 shows that having more organizations involved indeed makes a negative contribution to the probability of getting an authorization permit earlier. The curve can be read in the following way: On the y-axis, the probability of not receiving a construction permit is shown, with 0.00 being the full probability of receiving a construction permit. The x-axis displays the number of months since the met mast authorization. Four survival curves are plotted: Two are based on the maximally significant effect size, for which the number of organizations is significant at $p < 0.05$. The two others show the minimal effect size that is significant at least at the same level. For all, the proportional hazard assumption must still be maintained. One of each shows the curve for a number of involved organizations below the mean and one for an above-the-mean sized implementation arrangement.

The two curves that depict survival curves with above-the-mean-sized implementation arrangements (dark gray line and light gray dots) show substantially lower efficiency than then other two curves depicting probabilities with below-the-mean-sized implementation arrangements (light gray line and medium gray dot dash). Compared to figure 7.3 showing the baseline survival curve, WE-projects with smaller numbers of involved organizations are expected to undergo a more or similarly efficient authorization procedure. Those with many involved organizations have a much more inefficient survival curve than the baseline. Empirically, projects of the cantons of AG, GL, GR, JU, LU, SG, SH, SO, TI, UR, VS have had lower than average number of involved organizations. NE and FR, in contrast, have demonstrated a larger than average organizational involvement for all their projects. All other project cantons are not clearly attributable to either camp. As the number of organizations also depends on the stage of advancement of the project, the smaller arrangements contain both projects that have been planned early on, when it was not as conflictual as today, and projects that have not advanced to the public deposition stage.[227] The above-the-mean cantons are driven mostly by “difficult” project experiences, such as the “Crêt Meuron” project in NE or the “Schwyberg” project in FR.

227 The survival models accommodate for project advancement through censoring and process duration.

Figure 7.4: Survival curves and model fit graphs for two models with either maximum or minimum effect magnitude of the number of involved organizations.



Notes: * “N.O.” stands for “number of involved organizations”. Extracted from the full models estimation set of the ACMOI series. Minimal and maximal effect magnitude selected from those models that fulfill the proportional hazard assumption. For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean.

The residual graphs (left for the maximal magnitude model, right for the minimal magnitude model) depict the difference between a predicted data point and an empirically observed one. The Cox-Snell residuals present the negative natural logarithm of the survival curve (Kaplan-Meier estimator) as the dashed line and the observed values as the black dots connected through a black line, shown against the cumulative hazard (not probabilities) on the y-axis. The correspondence between the two indicates whether the relationship between determinants and time is appropriately modeled with a survival model (see Therneau and Grambsch 2000). Here, both models show a good fit regarding Cox-Snell residuals. The deviance residuals show the normalized differences between the likelihood of an observation in a model and the maximally possible likelihood[228] for this observation (see ibid.). Observation IDs on the x-axis (nominal numbers attributed to observation, continuous scale plotted for simplicity) are pitted against SD on the y-axis. None of the likelihoods of empirical observations are more than two standard deviations away from a maximally possible likelihood, indicating a good fit as well. No residual outliers need to be inspected more closely.

If one is to look at the detractor variables of significance, one can distinguish between those from the same analytical category ("internal", actor constellation (AC) or Mode of Interaction (MOI)) and those of other categories in the series ("external", from the "full" set).

I shall start with the former: Looking at the internal detractors of the ACMOI category to the main variable, the intensities of non-neutral relations (excluding zeroes) in all three themes of agreement/conflict, trust/mistrust and collaboration have been found to be significant. The number of organizations strongly correlates with intensities of relations in the agreement/conflict ($\rho = -0.71, p < 0.001$) and the trust/mistrust theme ($\rho = -0.66, p < 0.001$) but not with collaboration intensity ($\rho = -0.35, p < 0.1$). This means that intensities of non-neutral relations are assumed to directly impact (or be directly impacted by) the number of involved organizations. Collaboration intensity detracts only in combination with other IVs and thus affects (or is affected by) the number of organizations only indirectly. Trust/mistrust intensity is also a direct determinant of efficiency, whereas this is not the case for agreement/conflict intensity. Hence, trust/mistrust intensity affects both the number of organizations and efficiency, whereas the intensity of agreement/conflict relations affects only the number of organizations directly.

228 A saturated model has perfect fit but no degrees of freedom; see Therneau et al. 1990.

The collaboration intensity only affects the number of organizations in an implementation arrangement indirectly. This allows the interpretation that non-neutral relations may be behind the negative effect of the number of organizations on efficiency and that especially trust/mistrust is also independently driving efficiency itself.[229]

Regarding external detractors, there are two that have passed the reporting threshold: Both of them stem from the category of procedural policy rules: Including the index of the strength of private (not associational) complaints invalidates the negative effect of size on efficiency and correlates significantly with the number of organizations ($\rho = 0.69, p < 0.01$). The other is the number of construction permit reservations, although this detractor does not correlate significantly with the number of organizations involved ($\rho = 0.28, p > 0.1$). Still, including it lets the size of implementation arrangements become reliably insignificant. Both detractors do not pass the thresholds of significance to be reported as a single-standing and direct determinant of efficiency, but their detractor function indicates that the two variables — in the case of private complaints directly, in the case of construction permit reservations indirectly — drive the significance of the number of organizations. As the index of the strength and the variable of the number of organizations correlate positively and significantly, I assume a direct and positive effect. As the number of construction permit reservations does not correlate significantly with the number of organizations, the detractor must work (detract from the main variable significance) somehow indirectly, through constellations of factors.

229 There are some significant detractors to this, whose significance is explainable by the logic of measurement and is therefore only reported in a footnote. Still, it shall be presented briefly: The number of organizations, for example, is closely and positively associated with higher mean degrees (see glossary in the online appendix) in the collaborative ($\rho = 0.69, p < 0.001$), trust/mistrust ($\rho = 0.64, p < 0.001$) or agreement/conflict ($\rho = 0.64, p < 0.001$) themes. This is to be expected, because if there are more involved players, there will also be a greater absolute number of ties. The same is valid for reputational power, which also detracts from the significance of the number of organizations and is strongly positively related to it. Again, this is likely due to the fact that more involved players can only increase the reputational power score of the implementation arrangement, not decrease it ($\rho = 0.85, p < 0.001$). The number of organizations is also positively and very strongly correlated with the number of veto players ($\rho = 0.95, p < 0.001$). Although they are conceptually different, in the case of WE-project networks in Switzerland their measurement seems to overlap strongly, but this is likely to be related to measurement: A higher number of involved organizations cannot have fewer veto players, only more.

In summary, the negative effect of the number of organizations on efficiency becomes insignificant if there are stronger private complaints against a project, if there are more reservations in a construction permit, but also if there are intense non-neutral relations in it. The importance of trust and mistrust as a driver both of the number of involved organizations and of efficiency should be underlined.

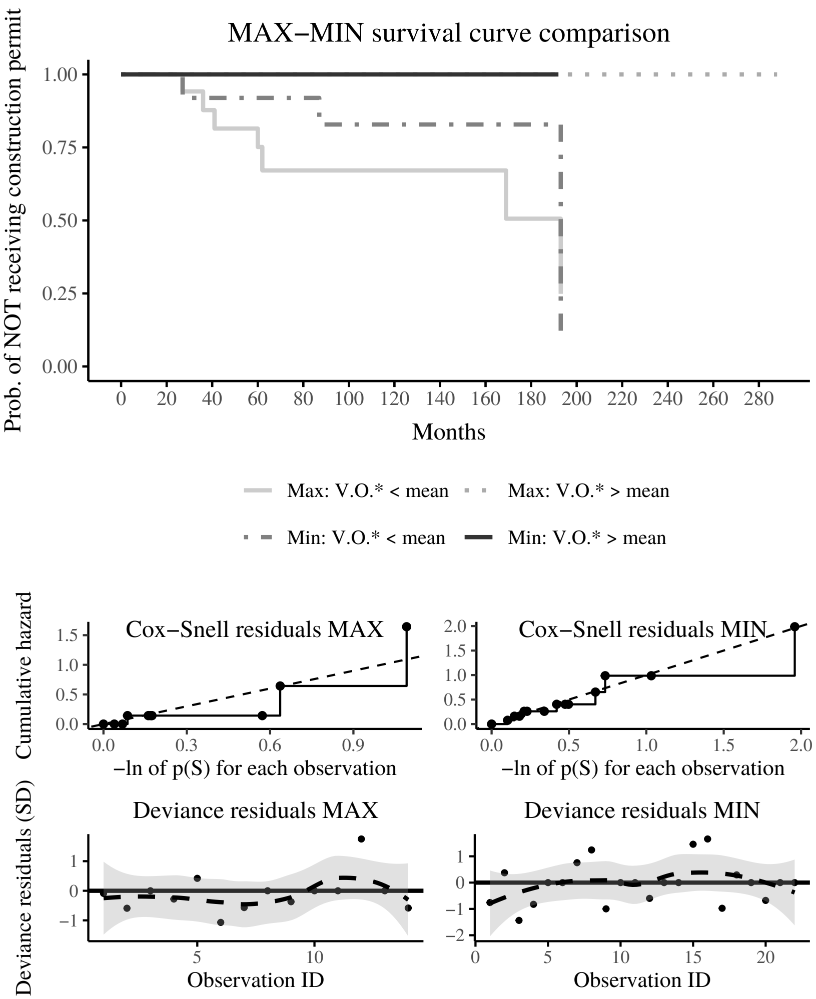
The number of veto players

The survival curve of the number of veto players is similar compared to the one testing the effect of the number of organizations. In figure 7.5, one can see that the slope of the minimal-coefficient is the same, but the slope of the models estimating the maximal and minimal effect of having fewer-than-mean veto players is comparatively less steep. That the probability to get a construction permit at any point is similar or lower than for the number of organizations on efficiency is to be expected, because veto players constrain the action space, which an additional participant organization does not necessarily do. Even the maximal effect of having a below-the-average number of veto players is similar to the baseline model (see figure 7.3). Therefore, veto players are mostly counterproductive, at best neutral, for efficiency. The cantonal projects are distributed exactly as in the number of organizations, with AG, GL, GR, JU, LU, SG, SH, SO, TI, UR, VS sporting a lower than the mean number of veto players and FR and NE showing an unequivocally higher number in their implementation arrangements. The remaining cantons (among others BE and VD) show a mixed distribution. The residual plots show an acceptable picture.

The category-internal detractors for the number of veto players remain the same as for the number of organizations — just much more tempered with regard to their "force" of detraction.[230] Notable are again the intensi-

230 The mean degree in collaborative ($\rho = 0.71, p < 0.001$), in the agreement/conflict ($\rho = 0.67, p < 0.001$) and in the trust/mistrust arrangements ($\rho = 0.72, p < 0.001$) detract from veto player significance on efficiency, although the number of IV configurations in which they do is limited. The reputational power score has been found to grow with the number of veto players ($\rho = 0.93, p < 0.001$). As the reputational power score of an implementation arrangement has also shown to be individually significant, it is both a direct driver of veto player significance and efficiency. Whether the number of veto players only "hides" behind a logic of reputational power or whether reputational power is only a result of an institutionally

Figure 7.5: Survival curves and model fit graphs for two models with either maximum or minimum effect magnitude of the number of veto organizations.



Notes: * "V.O." stands for "number of veto organizations". Extracted from the full models estimation set of the ACMOI series. Minimal and maximal effect magnitude selected from those models that fulfill the proportional hazard assumption. For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean.

ties of relations: Collaboration ($\rho = -0.11, p > 0.1$), agreement/conflict ($\rho = -0.8, p < 0.001$) and trust/mistrust ($\rho = -0.65, p < 0.001$) intensities reduce veto player significance, although the number of models in which they do is much more limited than for the number of organizations. As collaboration intensity is not in direct correlation, its detraction must work through combinations of factors. The intensity of trust/mistrust and agreement/conflict relations is a direct determinant of efficiency and a detractor. As for the number of organizations, the importance of non-neutral trust/mistrust stands out as a direct driver of the number of veto players but also as a direct explainer of efficiency.

Investigating the external detractors, I detected that they also have much less "force of detraction" in these veto player models than in the models on the number of organizations. This means that veto player effects on efficiency are extraordinarily robust to outside meddling. There is only one category-external detractor worth mentioning: The sectoral policy-rule measure on the question of whether municipalities feel closer to their performance limit regarding the task of energy provision reduces the significance of the negative efficiency effect of the number of veto players ($\rho = -0.13, p > 0.1$). In other words, a municipality feeling overwhelmed by these tasks reduces the inefficiency contribution of veto players. I propose the following interpretation: Being overwhelmed reduces the capacity to act as a veto player, although formally a municipality still keeps its power to be one. In this interpretation, an overwhelmed municipality is a *de facto* reduction of veto powers in the arrangement.

In summary, the number of veto players has a negative effect on the efficiency of WE-authorization procedures. As internal detractors, effects of greater trust and greater agreement lessen the significance of the negative effect of the number of veto organizations on efficiency. In addition, implementation arrangements in which municipalities are overwhelmed by their task of energy provision detract from the negative effect of veto players on efficiency. In the arrangement, overwhelmed municipalities could be understood as a reduction of the number of veto players in the arrangement. This important finding will be embedded in the literature in section 7.6..

---

attributed veto power remains an open question. From a statistical point of view, a correlation is likely, as both are strictly positive. The same can be said for the number of organizations that is by far the strongest internal-category detractor of the number of organizations ($\rho = 0.95, p < 0.001$).

Reputational power scores

Reputational power scores, as indicated by the four main categories of stakeholders (developers, cantons, municipalities, opponent NGOs; see section 5.6.2.), have demonstrated a negative effect on efficiency. Figure 7.6 presents the survival curves and residual plots that present an acceptable fit. On the survival curves, one can see that having a low-power implementation arrangement is beneficial for an implementation arrangement's decision-making efficiency. If the maximal magnitude is considered, then the effect is actually considerable in size, showing much greater efficiency than the baseline, especially up until around month 160. The minimal magnitude shows a slight but still positive efficiency-increasing effect compared to the baseline survival curve (as in figure 7.3). If one compares not to the baseline but to those arrangements with high reputational power, then the effect is strongly in favor of having lower reputational power to support efficiency. But the effect should be cautiously interpreted because reputational power correlates with the number of organizations ($\rho = 0.85, p < 0.001$) and with the number of veto players ($\rho = 0.74, p < 0.001$). A higher reputational power score comes with more involved organizations and veto players. The magnitude of the added reputation is always positive, yet the added reputational power differs between added organizations. Reputational power is thus not constrained to growing proportionally to the number of organizations or veto players. Nevertheless, the strong correlation between the two suggests that influence might be the result of the number of organizations and of veto players.

Looking at category-internal detractors, I have found that the number of organization does not fulfill the threshold, but the number of veto players does. This means that veto players significantly reduce the explanatory power of reputational power effects on efficiency, whereas the number of organizations involved does not. This is surprising, but it underlines that reputational power has an independent effect from the size of the arrangement on efficiency. Additionally, trust/mistrust relations in the arrangement have let reputational power become an insignificant predictor of efficiency. Trust/mistrust intensity is negatively correlated with reputational power ($\rho = -0.7, p < 0.001$), meaning that the more intense non-neutral relations are, the lower the reputational power scores in the arrangement. This is credible to the extent that having higher reputational power in an arrangement is likely detrimental to non-neutral trust relations, but an inverse effect would be difficult to conceptualize. This would suggest reputational power as a negative driver of neutral trust relations.[231]. Both of these detractors are also individually significant predictors of efficiency, widely passing the reporting threshold by themselves. Hence, they are not only direct drivers of (or driven by) reputational power but also directly affect efficiency.

As external detractors, five can be reported, and all stem from the category of procedural policy rules, except for the item of the self-reported municipal performance limit regarding the task of energy provision. This, in contrast, I consider to be a sectoral policy rule. All of these external detractors are not correlated with reputational power, neither do they directly influence efficiency significantly. This means that their detraction power on reputational power rests on configurations between other independent variables. Hence, all of them impact reputational power and efficiency only indirectly. Still, let me briefly explain them: Reputational influence becomes insignificant with depth of stakeholder involvement as evaluated by municipalities ($\rho = 0.19, p > 0.1$), by the amount of effort needed to evaluate the project by municipalities ($\rho = 0.01, p > 0.1$), by the degree of private complaints ($\rho = 0.09, p > 0.1$) and by the number of reservations formulated in the construction permit ($\rho = 0.39, p > 0.1$). Thus, there are no overall external direct drivers of reputational power, only these indirect ones.

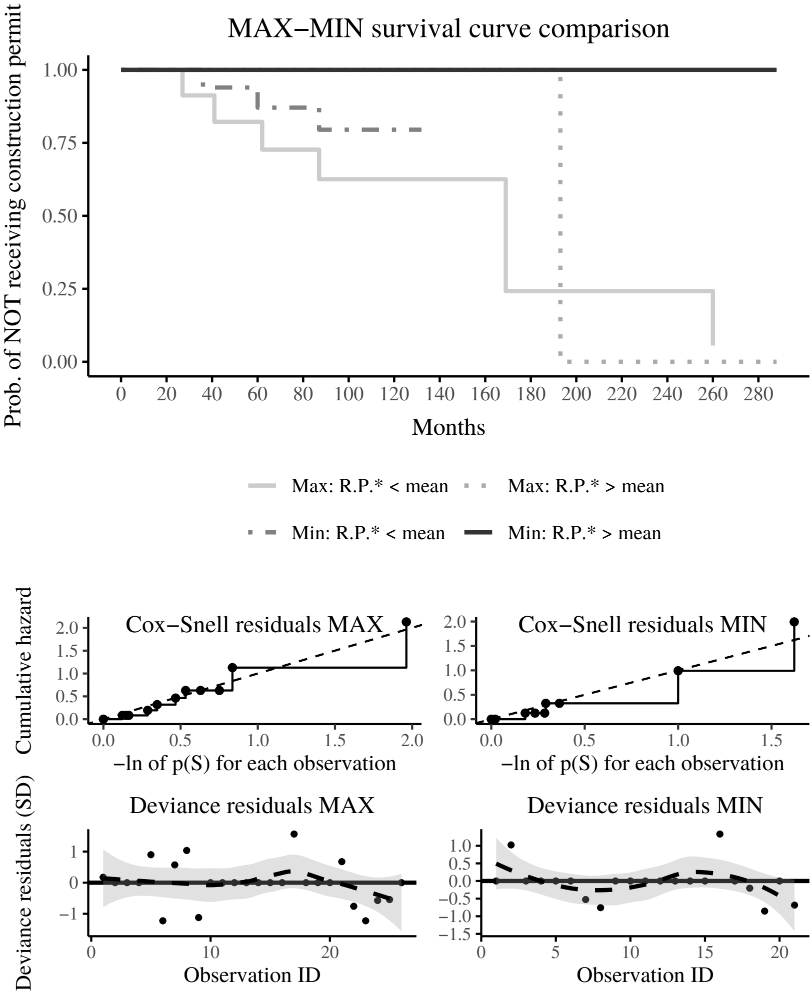
Overall, higher reputational power present in the implementation arrangement is detrimental to efficiency. Trust/mistrust intensity and the number of veto players are detractors that drive, or are driven by, reputational power. Both trust/mistrust intensity and the number of veto players impact efficiency directly as well. Reputational power is also indirectly influenced by some procedural and sectoral policy rules.

Coalition power differences

To further dive into the question of whether reputational power can be an independent driver of (in)efficiency, it is also worth investigating power differences between the proponent and opponent coalitions within an implementation arrangement. Those projects where reputational power is more

231 Reputational power is also made insignificant if there is a higher degree of collaboration present in the project network ($\rho = 0.58, p < 0.001$). However, the collaboration degree is highly correlated with the size of the network in terms of number of organizations ($\rho = 0.69, p < 0.001$), which is why it is not reported as a self-standing result here.

Figure 7.6: Survival curves and model fit graphs for two models with either maximum or minimum effect magnitude of reputational power index scores.



Notes: * "R.P." stands for "reputational power". Extracted from the full models estimation set of the ACMOI series. Minimal and maximal effect magnitude selected from those models that fulfill the proportional hazard assumption. For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean.

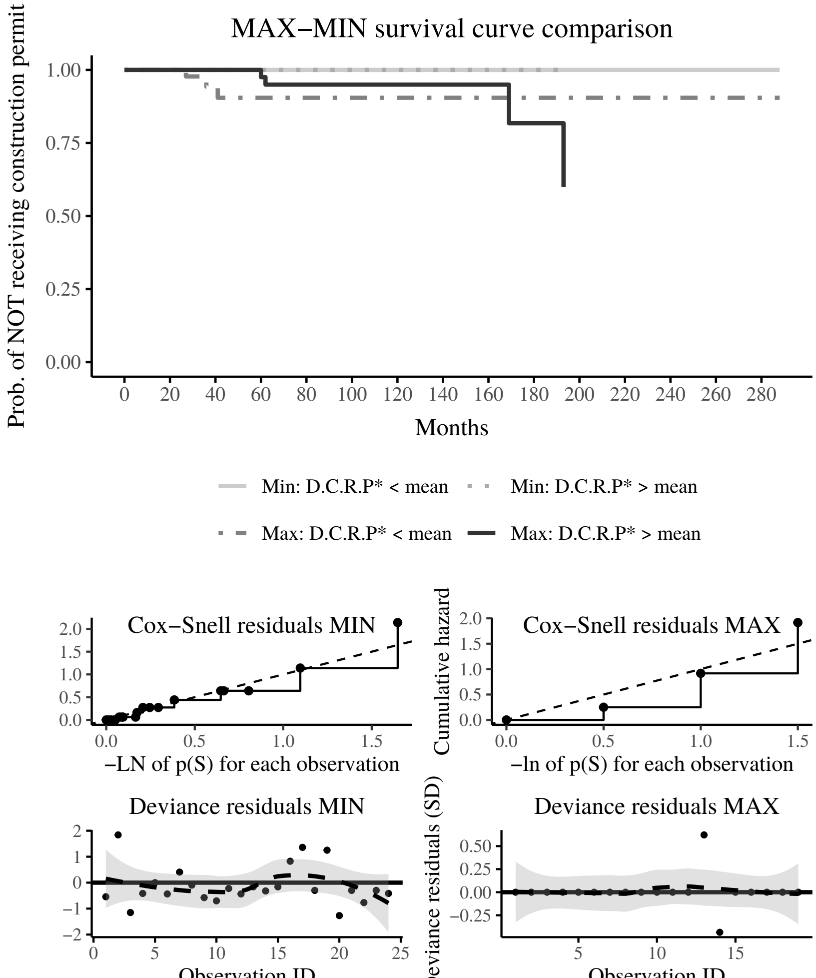
equally distributed between proponents and opponents have a score close to 0, those with a large difference in reputational power scores between coalitions logically have a larger score. The overall finding is that any difference is detrimental to efficiency, as compared to the baseline (as in figure 7.3): The maximal effect of small differences in power are nearly comparable to the baseline. This can be seen in figure 7.7. The residual plots depicted below the survival curves present an acceptable fit of the models.

All but one of the category-internal detractors do not correlate significantly with the coalition influence difference, the exception being agreement/conflict intensity ($\rho = -0.35, p < 0.05$), where higher influence difference between coalitions increases conflict (and decreases agreement). The difference in coalition power becomes insignificant when agreement/conflict intensity is added to the models: Larger power differences may thus be interpreted as partial drivers of the intensity of the underlying conflict intensity in the network. The other internal detractors are the following: The significance of the efficiency effect of power differences between coalitions is also driven down by the factors of mean betweenness centrality in the collaboration network ($\rho = 0.04, p > 0.1$), the mean intensity of collaboration ($\rho = -0.13, p > 0.1$), and the mean degrees in the agreement/conflict ($\rho = 0.18, p > 0.1$) and the trust/mistrust networks ($\rho = 0.18, p > 0.1$). These factors, however, do not correlate directly with coalition power differences; hence, they only drive (or are driven by) it in combination with other variables in the tested models. Moreover, none of the category-internal detractors retains individual significance regarding a direct effect on efficiency.

Regarding category-external detractors, both procedural policy rules factors of project evaluation effort by municipalities ($\rho = 0.11, p > 0.1$) and the strength of complaints by associations ($\rho = -0.09, p > 0.1$) reduce the negative to neutral effect of coalition power differentials on efficiency to insignificance. Neither of them is a direct driver of power differentials. However, the extent of associational complaints is a direct driver of efficiency, as will be seen later.

In summary, differences in reputational power are detrimental to efficiency. As detractors, the mean degree in the trust/mistrust network and the extent of associational complaints have an indirect or combinatorial effect on coalition power differentials but a direct effect on efficiency itself. In turn, the mean intensity in the agreement/conflict network is directly associated with coalition influence differences but does not form a direct effect on efficiency.

Figure 7.7: Survival curves and model fit graphs for two models with either maximum or minimum effect magnitude of the variable of difference in the coalitions' reputational power index scores.



Notes: * "D.C.R.P." stands for "difference between coalition's reputational power". Extracted from the full models estimation set of the ACMOI series. Minimal and maximal effect magnitude selected from those models that fulfill the proportional hazard assumption. For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean.

Trust density

Another AC-factor that has shown significant effects on the efficiency of the projects' authorization procedures is the density of trust in the implementation arrangement. This can be seen in figure 7.8. For this measure, all the neutral and mistrust ties have been deleted to make a binary network, meaning that the relation is trustful if there is a tie, and if there isn't any tie, the relation is either neutral or mistrustful.[232] Compared to the baseline (see figure 7.3), having small density with either the minimal or maximally estimated magnitude of effect has a detrimental effect on efficiency. The only effect that is slightly conducive to greater efficiency is a high trust density together with the maximally estimated effect size. The minimal effect of high density of trust in the arrangement shows a slightly lower efficiency than the baseline but is about comparable in the early months. Building dense webs of trust can thus be worth the while for public agencies and developers, but there is no guarantee that it will finally impact efficiency to the positive, and it could also be neutral or even slightly negative.

For trust density, there is one category-internal detractors of collaboration that needs reporting and is likely to be independent of size effects: Trust density becomes an insignificant efficiency explainer if collaboration intensity is added to the models ($\rho = -0.01$, $p > 0.1$). However, because collaboration intensity is not directly correlating with trust density, it unfolds its detractor-power only through combinations of independent variables. Collaboration intensity is also not a direct determinant of efficiency.

Additionally, there are various corollaries of size of the implementation arrangement that are detractors to density. Measures of density themselves are not size-dependent in their measurement, but in reality the density gets lower in larger arrangements gets lower, because keeping it constant would require an exponential growth of ties, and this is empirically unrealistic.[233] Hence, it is unclear whether one should really interpret size-dependent detractors materially; formally one would be allowed to, but empirics puts this in question. Hence, I choose not to do so and solely report them as correlations

232 To measure densities, this is the most purposeful network modeling specification.
233 The number of nodes n stands in the following relation to the number of maximally possible ties t: $t(n) = n(n - 1)/2$.

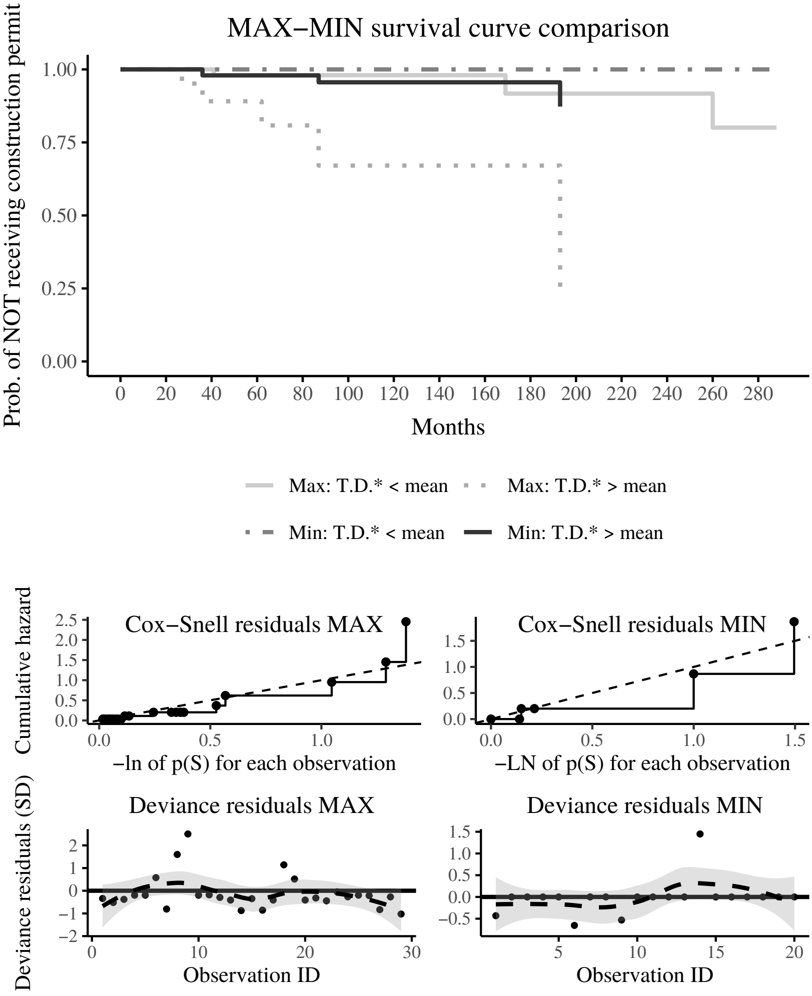
of minor importance.[234] The residual plots present an acceptable fit of the models.

Regarding detractors external to the category of ACMOI variables, some sectoral and procedural policy rules need to be reported. Most of them unfold their power of detracting from the significance of trust density only indirectly, through combinations of independent variables. For the procedural policy rules, these are the following: whether the pre-project and the project can be elaborated and assessed concurrently (concentrated authorization procedure) or not ($\rho = -0.12, p > 0.1$); whether developers have felt that the CSP has blocked them ($\rho = -0.12, p > 0.1$); the extent of associational complaints ($\rho = -0.29, p > 0.1$); the number of reservations in the authorization permit ($\rho = -0.14, p > 0.1$); whether or not there needs to be a regional structure plan for such projects ($\rho = 0.22, p > 0.1$); and whether developers have temporarily put their projects on hold ($\rho = -0.02, p > 0.1$). Of these variables, the strength of associational complaints and the developer estimation of being blocked through the CSP are also significant factors that impact efficiency directly, albeit not standing in direct relation to the density of trust. The only procedural policy rule variable that directly detracts from the density of trust is the extent of private complaints ($\rho = -0.68, p < 0.01$), but in turn this is not a significant direct factor when explaining efficiency. Compared to the mentioned procedural policy rules, the only sectoral policy rule that detracts from the density of trust is the municipal performance limit regarding the provision of energy ($\rho = 0.17, p > 0.1$).

Overall, a higher trust density is no guarantee for an efficiency improvement, but it is likely conducive to it. Collaborative intensity is an indirect detractor to trust density. Many size-dependent measures are also detractors that are not interpreted materially. Various procedural policy rules are external detractors, making trust density an insignificant predictor of efficiency. The strength of associational complaints is an indirect detractor to trust density but has a direct effect on efficiency itself. The strength of private complaints, in

234 These size-dependent detractors are the following: The number of organizations lets the network density of trust relations become insignificant and is in very strong negative correlation with it ($\rho = -0.91, p < 0.001$). The same is true for the factor of the number veto organizations, which is also in a strong ($\rho = -0.9, p < 0.001$) negative relation with the density of trust. Furthermore, collaborative density is also a detractor to trust density ($\rho = 0.62, p < 0.001$). The collaborative density correlates with trust density directly. Additionally, a higher betweenness centrality in the collaboration ($\rho = 0.61, p < 0.001$) and trust flows ($\rho = 0.41, p < 0.05$) are both directly related to trust density and act as detractors.

Figure 7.8: Survival curves and model fit graphs for two models with either maximum or minimum effect magnitude of trust density.



Notes: * "T.D." stands for "trust density". Mistrust relations excluded. Extracted from the full models estimation set of the ACMOI series. Minimal and maximal effect magnitude selected from those models that fulfill the proportional hazard assumption. For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean.

turn, is directly negatively related to the density of trust, but it is no direct determinant of efficiency by itself.

Trust intensity

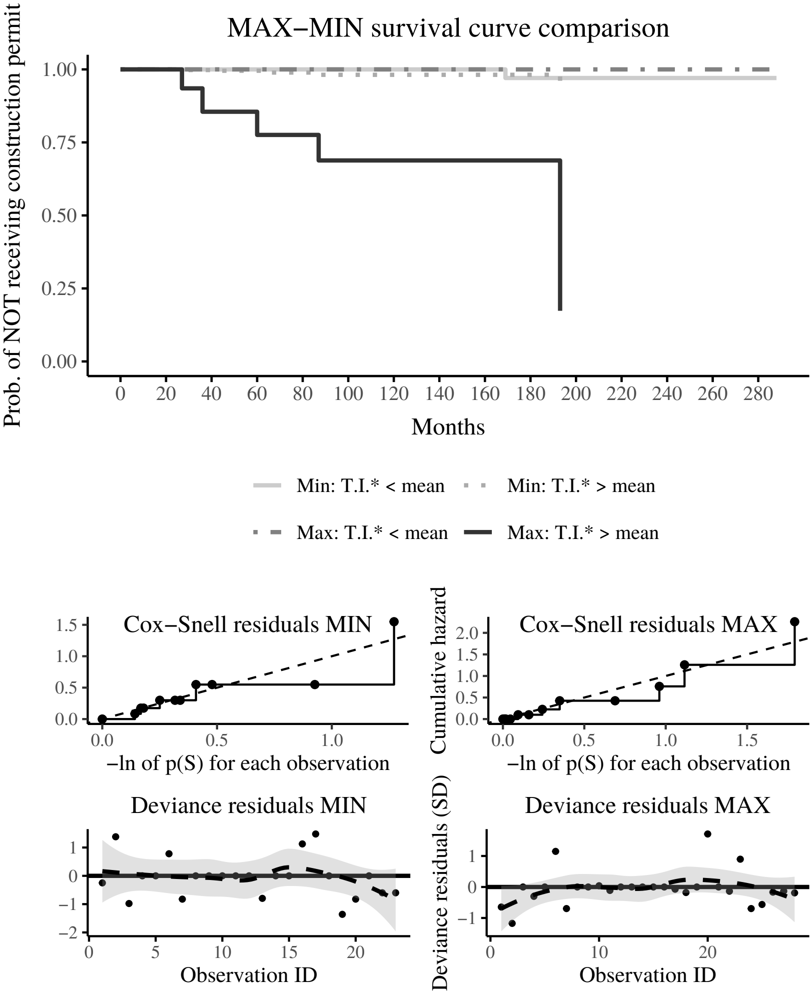
The intensity of trust relations in a WE-implementation arrangements has also been found to be a driver of efficiency of authorization procedures. Figure 7.9 depicts this. It shows a similar picture as for trust density: Below-the-mean trust intensity and minimally estimated effect sizes show a clear negative effect with regard to the baseline reported in figure 7.3. But a minimal effect size for above-the-mean trust intensity is clearly lower than the baseline, more so than for the density of trust. The maximal effect size for above-the-mean intensity of trust is highly positive compared to the baseline. A lack of intense trust is thus detrimental to efficiency, whereas high intensity is likely to be supportive; for the density of trust, however, there is no guarantee for it. The positive effect is especially pronounced in the earlier months, up to ca. month 80. The residual plots show an acceptable fit.

Category-internal detractors for trust intensity are the intensity of agreement/conflict ($\rho = 0.61, p < 0.001$), the intensity of collaboration ($\rho = -0.17, p > 0.1$) and various size correlates.[235] Whereas the collaboration intensity measures works to detract the significance of trust intensity on efficiency only indirectly, through combinations of independent variables, the size correlates show a clear sign: Not only do they directly negatively influence trust intensity, but they also negatively affect efficiency directly as well. Agreement/conflict intensity directly drives, or is driven by, trust intensity, and in any case it is very similar to it, but it is not a self-standing efficiency determinant by itself.

As external detractors, two sectoral and procedural policy rules can be reported: They are the two "usual" suspects, namely the sectoral policy rule factor of municipal performance limit concerning energy provision ($\rho = 0.26, p > 0.1$) and the procedural policy rule factor of the number of reservations in the construction permit ($\rho = -0.52, p > 0.1$). Neither of them impact trust intensity directly, and they do not directly affect the efficiency

235 These are the number of organizations ($\rho = -0.66, p < 0.001$), the number of veto organizations ($\rho = -0.65, p < 0.001$), mean degrees in the collaboration network ($\rho = -0.69, p < 0.001$) and the reputational power measures ($\rho = -0.71 to -0.66, p < 0.001$).

Figure 7.9: Survival curves and model fit graphs for two models with either maximum or minimum effect magnitude of trust intensity.



Notes: * "T.I." stands for "trust intensity". Extracted from the full models estimation set of the ACMOI series. Minimal and maximal effect magnitude selected from those models that fulfill the proportional hazard assumption. For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean.

of the authorization procedure. Instead, their detractor power unfolds only in combinations with other independent variables.

In summary, trust intensity likely — but not necessarily — has a positive effect on efficiency. A larger implementation arrangement has lower trust intensity. Keeping agreement high or building towards higher agreement can be considered to be a direct driver of higher trust intensity. Higher collaborative intensity, in turn, benefits trust intensity only indirectly. A limited number of procedural and sectoral policy rule variables has an indirect detractor effect on trust intensity.

Summary

The preceding discussion on actor constellation and mode-of-interaction factors that impact the efficiency of an authorization procedure has uncovered six of them: The number of organizations and of veto players affect efficiency negatively. Higher presence of more powerful organizations in the arrangement and greater differences between opponent and proponent coalitions also are an obstacle to greater efficiency. In contrast, the density of trust and its intensity have a duration-reducing, positive impact on efficiency, but whether it is better than the baseline is by no means guaranteed.

I shall first report the results of the internal detractors: The number of organizations and/or the number of veto players are closely associated with trust/mistrust intensity and reputational power. Reputational power, in turn (other than being associated with trust/mistrust intensity, the number of organizations and the number of veto players), also stands in close association with the intensity of conflict. The larger the difference of reputational power between coalitions, the larger the intensity of non-neutral agreement/conflict relations between the two opposing coalitions. More specifically, larger differences of coalitional reputational power are associated with greater conflict intensity, meaning less agreement. Trust density and intensity are also dependent on the number of organizations and veto players. These are related negatively to trust density and to trust intensity. In other words, a lower number of involved organizations or lower number of veto players drives higher trust density and intensity (both trust itself as well as trust/mistrust intensity of non-neutral relations).

Aside from directly building trust intensity and density that enhances efficiency as compared to higher levels of mistrust, there is also the possibility of investing time and effort in collaboration to increase trust. For the density of trust, it is better to invest into more collaborative ties, no matter their intensity. For greater trust intensity, in turn, the fostering of intensive collaborative ties is in the foreground. In all reality, I assume that density and intensity are somewhat conflated measures of a single latent variable. Although they can and should be analytically separated, in reality both should be fostered to enhance efficiency — aside from primarily keeping the arrangement small in number of participation organizations and veto players.

Category-external detractors to significant actor constellation efficiency determinants tend not to be directly related to actor constellation variables[236]; thus, external detraction power stems mostly from effects of combinations of variables. Detractors to the number of organizations are the municipal performance limit estimation for energy provision and the extent of conditional stipulations in the construction permit. Reputational power, trust density and trust intensity are also made insignificant by including them in combination with other variables. One pathway suggests that municipalities not being overwhelmed by energy provision are able to mitigate, together with other factors, a potential negative effect of greater numbers of organizations and veto players to a greater extent. Another possible driver of negative effects of size and veto players on efficiency could be the number of reservations in the construction permit, acting in combination with other factors. Regarding the fostering of trust, the detractors of extent of associational complaints and of developers feeling blocked by the CSP-elaboration have made positive effects of trust on efficiency disappear. The results suggest that the number of trustful relations does not matter if these two "difficulties" are present, in combination with other variables. Importantly, these two are also individually significant obstacles to efficiency, as will be seen later. Efficiency-detrimental differences between reputational power scores of coalitions are also rendered meaningless when the extent of associational complaints is included, in combination with other variables.

7.4.2. Actor orientations

In both sets (full and internal) of the actor orientation series (formula 7.2), not a single actor-orientation factor passed the reporting threshold for effi-

236 Except for the extent of private complaints in the number-of-organizations and the trust-density models.

ciency. This means that the efficiency of WE-authorization procedures can be considered to be independent of actor orientations. This is surprising as one could expect a speedier treatment of an authorization procedure if all stakeholders have favorable orientations towards a project. However, this is not the case. Even a favorable mean of orientations in a project towards a WE-project does not make it speedier.

Does this mean that orientations do not matter for efficiency? Yes and no. Yes, because having orientations alone, without ensuing actions that execute the "favorable spirit", orientations do not make a difference for efficiency. No, because the measures have their limits regarding the capturing of polarization of orientations within WE-projects: For project orientation scores, I used means of all stakeholders per orientation item. To capture differences between proponent and opponent coalition orientations, I took the mean of negative scores to get at the opponent score and did the same for proponents with positive scores. The differences between these two means were then retained for the project as a measure of polarization of orientations within a WE-implementation arrangement. Resorting to means strongly reduces the available variance.[237] Yet, I did not calculate alternative measures for the reason of parsimony. Alternatives, for example, would have been a count measure of how many stakeholders are in favor or against a project. But such a measure, in turn, would have neglected the strength of such orientations.

Despite the measurements' shortcomings, I shall still interpret the finding materially: The descriptives (in table 5.20) showed that differences between mean opponent and proponent coalitions are relatively stable. This would indicate that many projects have very similar distributions of preferences — and if these distributions were constant across WE-projects, then they could not explain differences of efficiency assuming a statistical understanding of regularity in causation.

7.5. Results of stakeholder efficacy rating models

As opposed to the previous section explaining efficiency, the present section reports those variables of the categories of actor constellation and modes of interaction that are in controlled statistical association with stakeholder efficacy ratings. Results presented in detail below show that the number of

237 Taking the mean of an orientation of -2 and 2, for example, equals 0. So is the mean of -0.1 and 0.1. Means are not maximal spans between orientations.

organizations, the number of veto organizations, higher reputational power scores and the degree of agreement/conflict have significant impacts on efficacy as rated by stakeholders. Reporting thresholds for the PSE measure of stakeholder efficacy ratings are exactly the same as for the measure of efficiency.

Except for the intensity of agreement/conflict, where higher agreement in the arrangement is positively related to overall stakeholder efficacy, all other reported ACMOI variables are in a negative relation: A higher number of organizations involved, a higher number of veto players and higher reputational power scores have a negative impact on stakeholder efficacy ratings. Readers will find the detailed discussion on the various ratings and ACMOI variables first, followed by the presentation of actor orientation effects thereafter.

7.5.1. Actor constellations and modes of interaction

The number of organizations

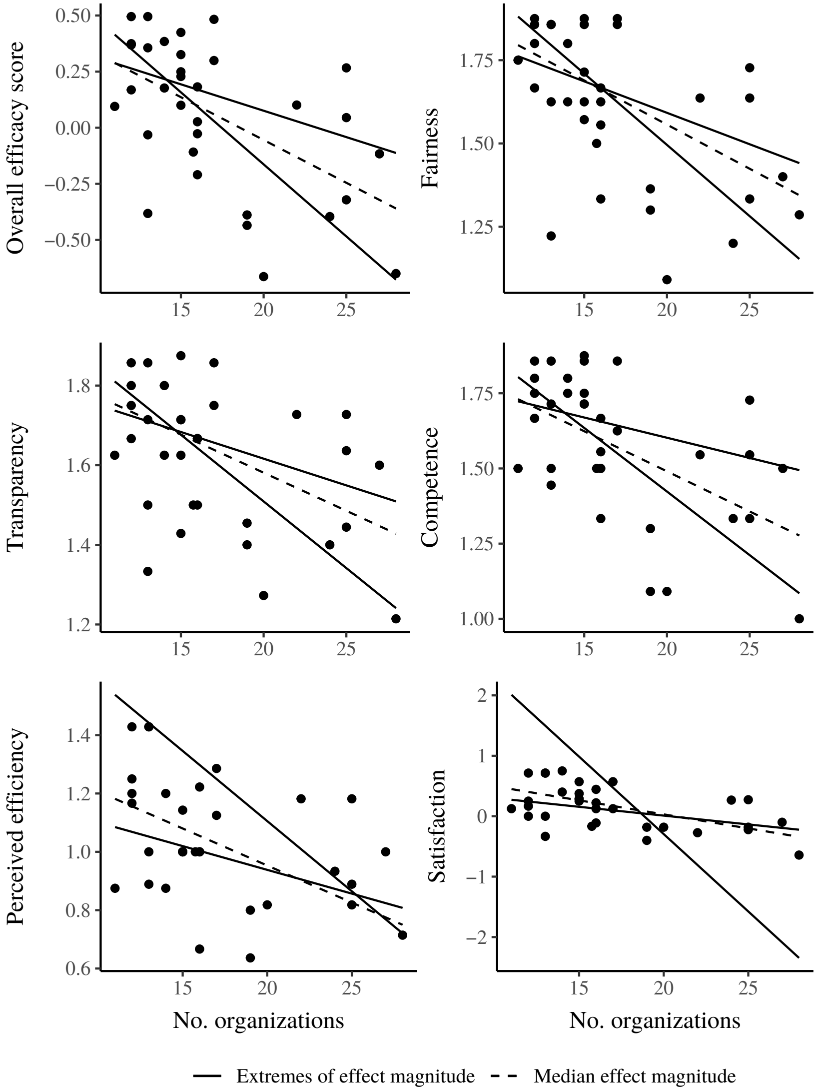
The first factor that has a clear significant impact on stakeholders' efficacy ratings is the number of organizations. A greater number of organizations involved in a WE-implementation arrangement has negative consequences for efficacy ratings throughout all dimensions of rated efficacy. Figure 7.10 — as do all subsequent efficacy graphs — shows the slopes of those models that show a maximal, minimal (full lines) and median (dotted line) significant ($p < 0.05$) effect of the number of organizations on stakeholder efficacy ratings, while keeping the other independent variables at the mean.

The slope of the median effect of the number of organizations on the overall efficacy factor score is sizeable, with a decrease of -0.04 points (11.6% of its SD)[238] per number of organization added (21% of its SD). The median slope in all other stakeholder ratings dimensions is very similar in size, with a decrease in the stakeholder ratings dimension of 10.9% to 13.1% of the respective SD for an increase of one involved organization.

Regarding internal detractors, there are many ACMOI concepts that let the number of organizations become an insignificant predictor of stakeholder

238 The standard deviation of a z-score is 1 by definition. This would make a decrease of -0.04 points of decrease of -4%. However, I measure the SD based on the sample, and the two differ markedly. I will refer to the empirical sample SD instead of the definitional one in the following.

Figure 7.10: Stakeholder ratings by dependent variable. The independent variable measures the number of organizations involved per project.



Notes: Dots indicate the bivariate distribution of observations. The regression lines indicate slopes depicting the most extreme and median slope estimates of the variable shown on the x-axis. These regression lines are drawn from the sample of those models in the ACMOI series that contain a significant instance of the variable in question.

efficacy ratings. The mean degrees in the trust/mistrust ($\rho = 0.64, p < 0.001$), the agreement/conflict ($\rho = 0.64, p < 0.001$) and the collaboration network ($\rho = 0.69, p < 0.001$) correlate strongly with the number of organizations.[239] Most significantly, however, the strongest correlate and detractor of the number of organizations is the number of veto players ($\rho = 0.95, p < 0.001$). This is a direct influence, as a higher number of veto players forcibly also augments the number of involved organizations.

In addition to the expectable size correlates, there is, however, no logical relation between the intensity of relation and the arrangement size, although they correlate negatively for the trust/mistrust ($\rho = -0.71, p < 0.001$) and the agreement/conflict networks ($\rho = -0.71, p < 0.001$). These intensities can be assumed to be direct drivers or consequences of arrangement size. The collaboration intensity ($\rho = -0.03, p > 0.1$) does not correlate with arrangement size and, therefore, it detracts from the significance of arrangement size only indirectly.

The betweenness centrality (see glossary in the online appendix) of the four main actors (developers, canton, municipalities, NGO opponents) is strongly negatively related to arrangement size in the collaboration ($\rho = -0.72, p < 0.001$) and the trust/mistrust ($\rho = -0.72, p < 0.001$) themes of the arrangements. Betweenness centrality is not predictably or theoretically related to the size of an arrangement.[240] This is evidence that the brokering power of the four main stakeholders decreases directly once additional players are involved.

---

239 As explained for efficiency already, this seems logical: The more organizations are present, the more ties of any sort there are on average. The same is true for density, although it is a relative measurement of completion: The larger the network, the harder it is to have a complete network, because the number of possible relations grow exponentially when the number of involved organizations grows linearly. It is thus empirically "natural" to observe smaller densities in larger networks (trust/mistrust: $\rho = -0.56, p < 0.001$, agreement/conflict: $\rho = -0.55, p < 0.001$, collaboration: $\rho = -0.55, p < 0.001$). Additionally, reputational power scores also directly detract from arrangement size significance ($\rho = 0.63, p < 0.001$), but this might be a size correlate as well.

240 Although the number of pairs considered increases (denominator), the number of geodesics that pass through the focal node stays the same or increases (numerator). Thus, whether the fraction increases or decreases in value cannot be theoretically determined with network size. It further cannot be determined whether additional terms due to more nodes in a sum will result in a higher or lower total betweenness centrality of a focal node.

Another theoretically independent-of-size detractor is the difference in reputational power scores between coalitions ($\rho = 0.27, p > 0.1$). It does not impact the number of organizations directly, as it does not correlate with the number of organizations, neither is it a self-standing determinant of stakeholder ratings of efficacy. It only works its detractor power indirectly through combinations of independent variables.

The finding of a negative effect of the number of organizations on stakeholder efficacy ratings is surprising given the literature's conditional praising of inclusion and participation as an effectiveness-furthering recommendation (e.g. Schweizer and Bovet 2016, 68; Fraune and Knodt 2017; Hammarlund et al. 2016; Devine-Wright 2014). I suggest two possible reasons to explain this important finding: First, WE-projects in Switzerland are so politically entrenched that there is fear of opening up the project planning process "too much" because it is expected that participants will show blocking behavior. Second, unorganized citizen participation is not covered in the measurement of network size, as only organizations are included. Moreover, these organizations are veto players, capable of substantially delaying or canceling the project altogether. Nevertheless, it is safe to say that greater organizational participation has not led to greater appraisal of the authorization procedure, rather the inverse.

Category-external detractors are three procedural policy rules, of which two reduce the significance of the number of organizations only in combination with other variables: the extent of associational complaints ($\rho = 0.37, p > 0.1$) and whether the project has undergone or is currently undergoing a concentrated planning procedure ($\rho = 0.06, p > 0.1$). The third procedural policy rules detractor, this time reducing the significance of stakeholder efficacy ratings directly, is the number of reservations in the construction permit ($\rho = 0.28, p < 0.1$).

The number of organizations is also correlated with the cantonal partisan cluster ($\rho = 0.58, p < 0.001$), which was used to reduce the partisan dimensions of WE-hosting probabilities for automated estimation use.[241] The extent of associational complaints has also been found to directly impact stakeholder efficacy ratings, not only the number of organizations directly. So does the partisan cluster: Both of its dimensions, the share of green parties in cantonal parliaments ($\rho = 0.43, p < 0.05$) and the share of left-party members in the cantonal executive ($\rho = 0.6, p < 0.001$), correlate with ar-

241 For information on how the cluster has been formed, see footnote 217. Proceedings and graphs are available upon request.

rangement size. As the share of left-party members in the cantonal executive is also an independent determinant of stakeholder efficacy ratings, I interpret this as left parties partly driving the negative effect of arrangement size on stakeholder efficacy ratings.

In summary, the larger size of an WE-implementation arrangement has an unequivocal negative effect on how stakeholders perceive the efficacy of the WE-authorization procedure. The overall efficacy score as well as all of its components show a significant negative slope for all effect magnitudes. Regarding internal detractors, a higher number of organizations is driven by increases in conflict, decreases in trust, increased reputational power present in the arrangement and lower collaboration betweenness of the four main actors. A higher number of veto players, a greater intensity of agreement/conflict and higher reputational power scores also directly influence stakeholder efficacy ratings, not only its determinant of the number of organizations. Whether the number of organizations affects or is affected by these independent drivers of efficacy ratings cannot be stated for certain. Regarding external detractors, three procedural policy rules and the cantonal partisan cluster have been found to be potential drivers of the number of organizations.

The number of veto players

Like a higher number of organizations, a higher number of veto players will also lead to a substantial decrease in stakeholder efficacy ratings. The greater their number, the lower stakeholders consider fairness, efficiency and overall satisfaction to be. Regarding the overall efficacy score, the transparency and the competence dimensions, it need not be the case that significant models present a negative effect, as the positively sloped lines in figure 7.11 show. But the positive effects are quantitatively negligible, as only between 0.54% and 0.67% of all significant models of the respective dimensions show such a positive sign. The median slopes remain negative for all constellations and effectiveness dimensions. Moreover, the slopes are considerable in magnitude: An increase in the number of veto players by 1 organization (29.1% of its SD) results in a decrease of overall efficacy ratings by -0.062 points, i.e. 19% of its SD. The slope of the median regression lines remains similar across all efficacy rating-dimensions, with a decrease ranging between 17.2% and 19.7% for an increase of a single veto player. The small differences between the extremes of effect magnitudes in the satisfaction graph (bottom right) show that the decrease in this stakeholder efficacy rating dimension is especially unequivocal.

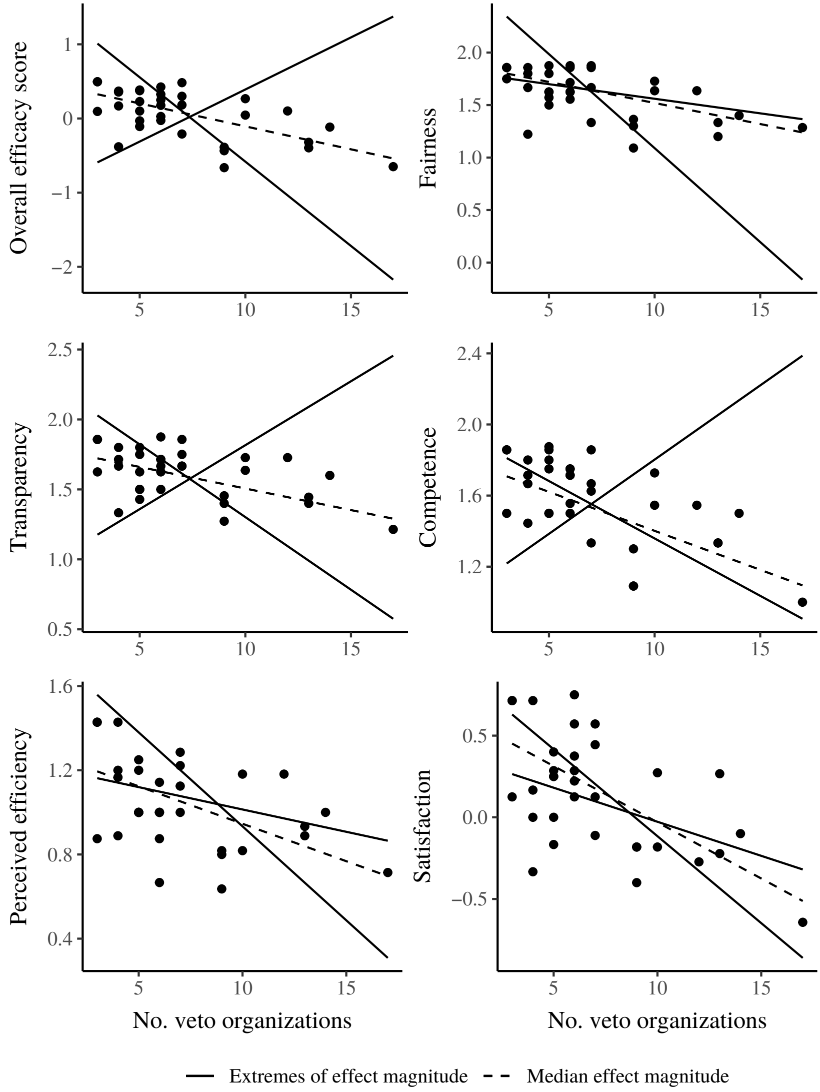
As category-internal detractors, the usual suspects of size correlates such as the degrees (trust/mistrust: $\rho = 0.67, p < 0.001$, agreement/conflict: $\rho = 0.67, p < 0.001$, collaboration: $\rho = 0.71, p < 0.001$), but also of density (trust/mistrust: $\rho = -0.54, p < 0.01$, agreement/conflict: $\rho = -0.53, p < 0.01$, collaboration: $\rho = -0.69, p < 0.001$), show significance as direct detractors. If included in the models, reputational power scores also reduce the significance of the number of veto players substantially, with which they strongly correlate ($\rho = 0.74, p < 0.001$). Unsurprisingly, the number of organizations is also a direct detractor to the number of veto players. As seen previously, the two correlate strongly ($\rho = 0.95, p < 0.001$).

Unrelated to arrangement size, there are two important internal detractors of relational intensity: The intensity of relation in the agreement/conflict network can be said to directly detract from the negative effect of a higher number of veto players, as the two variables correlate strongly negatively ($\rho = -0.8, p < 0.001$). This finding is certainly central: The effect of the number of veto players on stakeholder ratings of efficacy drives or is driven by the intensity of conflict. Indirectly, the significance of the number of veto players also drives or is driven by collaboration intensity ($\rho = -0.11, p > 0.1$).

Three procedural policy rules are external category detractors: First, there is the extent of associational complaints that is directly influenced by the number of veto players ($\rho = 0.45, p < 0.1$), which also independently drives stakeholder efficacy ratings. Second, there is the number of reservations in the construction permit that reduces significance of the number of veto players if included in the models. Neither do the two correlate ($\rho = 0.32, p > 0.1$), nor is the number of reservations in the construction permit a significant predictor of stakeholder efficacy ratings. The third procedural policy rules factor is similar in this regard: Neither does the variable of whether the project has undergone a concentrated planning procedure correlate with the number of veto players ($\rho = 0.11, p > 0.1$), nor does said variable influence stakeholder ratings of efficacy significantly. This variable only detracts from the number of veto players in combination with other variables.

In summary, a greater number of veto players has been found to clearly reduce efficacy as rated by stakeholders. The positive slopes on figure 7.11 present rare exceptions. Regarding internal detractors, the intensity of agreement/conflict is notable, where higher conflict leads to higher number of

Figure 7.11: Stakeholder ratings by dependent variable. The independent variable measures the number of veto organizations involved per project.



Notes: Dots indicate the bivariate distribution of observations. The regression lines indicate slopes depicting the most extreme and median slope estimates of the variable shown on the x-axis. These regression lines are drawn from the sample of those models in the ACMOI series that contain a significant instance of the variable in question.

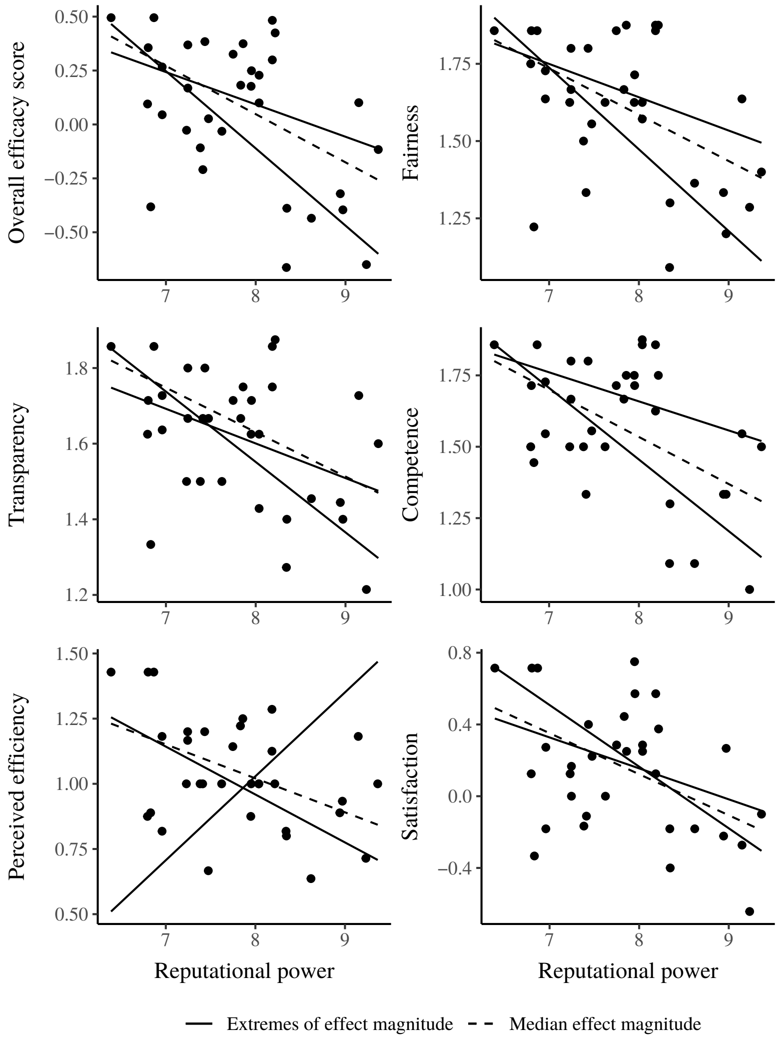
veto players or the inverse. As external detractors, the extent of associational complaints stands in negative correlation with the number of veto players. It is also a self-standing stakeholder efficacy determinant.

Reputational power scores

Next to network size and the number of veto players, the extent of reputational power present in a WE-implementation arrangement also has a robust and reliably negative effect on efficacy ratings by stakeholders. Figure 7.12 evinces this relation regarding all six stakeholder efficacy ratings dimensions. For an increase in reputational power by 1 point (+129.5% of its SD), the median slope shows a decrease of the overall efficacy score by -0.22 (68.4% of the SD). The decrease in median effects is similar for all stakeholder efficacy dimensions: An increase in reputational power by 1 point leads to a decrease ranging from 63.3% to 70.5% of the respective SD. Looking at extreme effect magnitudes, the picture is unequivocally negative for increased reputational power, except for the stakeholder efficacy dimension of efficiency opinion, in which the maximal effect magnitude shows a positive sign and slope. But this positive effect is negligible, as only 1.9% of the significant models of this efficacy dimension demonstrate such a positive sign. In consequence and in most cases, reputational power will have a negative effect on efficacy ratings by stakeholders.

In terms of internal detractors, reputational power correlates with arrangement size ($\rho = 0.63, p < 0.001$) to a strong, yet not overly strong degree, meaning that it can still be expected to have an independent effect on stakeholder efficacy ratings from the effect of the number of organizations or of other size correlates. Logically, also for reputational power there are category-internal arrangement size variables that let the effect of reputational power become insignificant: Mean degrees (trust/mistrust: $\rho = 0.61, p < 0.001$, agreement/conflict: $\rho = 0.61, p < 0.001$, collaboration: $\rho = 0.58, p < 0.001$), but also densities (trust/mistrust: $\rho = -0.13, p > 0.1$, agreement/conflict: $\rho = -0.12, p > 0.1$, collaboration: $\rho = -0.12, p > 0.1$) detract from reputational power significance, although collaboration degrees and densities only do so in combination with other variables, whereas measures of the other two themes do so directly. There is also the number of veto players that is a strong detractor and driver of reputational power scores ($\rho = 0.74, p < 0.001$).

Figure 7.12: Stakeholder ratings by dependent variable. The independent variable measures reputational power of involved organizations averaged over their categories within projects.



Notes: Dots indicate the bivariate distribution of observations. The regression lines indicate slopes depicting the most extreme and median slope estimates of the variable shown on the x-axis. These regression lines are drawn from the sample of those models in the ACMOI series that contain a significant instance of the variable in question.

Unrelated to size, there is also the mean betweenness centrality[242] of the four main actors in the collaboration ($\rho = -0.42, p < 0.05$) and the trust/mistrust networks ($\rho = -0.56, p < 0.001$) that are direct drivers of reputational power scores and detract from their significance: The greater the reputational power in the project network, the lower the betweenness centrality of the four main actors. With higher reputational power scores of the arrangement, the four main actors thus lose brokering power. Additionally, as already detected for the number of organizations and veto players, relational intensities (trust/mistrust: $\rho = -0.7, p < 0.001$, agreement/conflict: $\rho = -0.62, p < 0.001$, collaboration: $\rho = -0.26, p > 0.1$) are also strong detractors, where only collaboration intensity is an indirect driver of reputational power.

As external category detractors, five procedural policy rule variables, one sectoral policy rule variable and one partisan cluster variable have passed the reporting threshold. Of these seven variables, only the partisan cluster can be considered a direct driver of reputational power score significance reduction ($\rho = 0.33, p < 0.1$). All others unfold their detraction power for reputational power effects on stakeholder efficacy only in combination with other independent variables. These are the procedural policy rules variables of the extent of associational complaints ($\rho = 0.28, p > 0.1$), project-blocking through the CSP ($\rho = 0.09, p > 0.1$) the number of reservations in the construction permit ($\rho = 0.39, p > 0.1$), whether project planning has been intermittently paused or not ($\rho = 0.04, p > 0.1$) and whether the project has undergone a concentrated authorization procedure or not ($\rho = -0.16, p > 0.1$). Of these, the extent of associational complaints is also an individually significant direct and negative effect determinant of stakeholder efficacy ratings by itself. The sectoral policy rule of the municipality reaching the performance limit regarding energy provision ($\rho = -0.16, p > 0.1$) is an indirect effect detractor that is an individually insignificant explainer of stakeholder efficacy ratings.

The only external effect detractor that can be considered a direct driver of reputational power effects is the partisan cluster ($\rho = 0.33, p < 0.1$). It measures the partisan conditions of hosting probabilities for WE-projects on the cantonal level. Looking at the cluster's components, the individual cantonal partisan variables, one can see that reputational power is higher in those projects where the cantons show a higher degree of left-party members in the executive ($\rho = 0.45, p < 0.01$). It is also the case that in projects whose

242 See footnote 240.

arrangements sport high reputational power scores cantonal parliaments also have a higher share of green party members ($\rho = 0.32, p < 0.1$). As already noted when discussing detractors to the number of organizations, because the two partisan variables are also correlates to arrangement size (left-party share in cantonal executives: $\rho = 0.6, p < 0.001$, green-party share in cantonal parliaments: $\rho = 0.43, p < 0.05$), I argue that left and/or green parties drive reputational power through a sprawling-size effect.

Overall, higher reputational power, a strong arrangement-size correlate, has been detected to have overwhelmingly negative effect on stakeholder efficacy ratings for all its components. The negative effects are very strong in magnitude. Regarding detractors, the analysis has shown that higher reputational power scores can be replaced by more intense conflict and more intense mistrust. Agreement/conflict intensity, the number of organizations and the number of veto players are not only direct effect detractors, they also independently impact stakeholder efficacy ratings. Hence, to counteract the negative effect of reputational power, these results suggest that it is productive to invest in building agreement, keeping the network small in number and reduce veto powers. Concerning external detractors, especially the cantonal level partisan cluster is remarkable as it suggests that cantonal left and/or green parties drive the number of involved organizations, which spike up reputational power in the arrangement.

Agreement/conflict intensity

Whether there is conflict or agreement in a WE-arrangement also matters for efficacy ratings by stakeholders. Figure 7.13 depicts these relations. In fact, the agreement/conflict intensity shows large positive effects for more intense agreement and large negative effects for more intense conflict. An increase on the agreement/conflict scale by one point (scale from -2 (conflict) to +2 (agreement), including 0) represents a change of 376.6% of the SD. The distribution of intensity of relation is thus very concentrated. For each additional point in agreement (or less conflict), there is an increase in overall stakeholder efficacy rating of 1.05 points (322% of its SD). For the other stakeholder efficacy rating dimensions, an increase by 1 point on the agreement/conflict scale results in a 253.1% to 322% SD-change in the respective efficacy dimension. Again, these are large effect sizes. Counter to the story, extreme estimates for both the transparency dimension and the satisfaction dimension show negative slopes for an increase in agreement, but for both dimensions significant negative estimates remain marginal in number: For transparency, only 0.51% of significant models show a negative sign. For satisfaction, this percentage is 0.57%.

There are no category-internal detractors to the significance of agreement/conflict intensity. This means that the variable is indeed uniquely suited to explain stakeholder efficacy ratings. Regarding external category detractors, there are only two of them, both are procedural policy rules variables: the number of reservations in the construction permit ($\rho = -0.7, p < 0.05$) and whether the project underwent or is currently undergoing a concentrated authorization procedure ($\rho = -0.18, p > 0.1$). Although the reservations variable might drive or be driven by the existence of conflict directly, the concentrated procedure variable only unfurls its detractor power in combination with other variables. None of them are individually significant determinants of stakeholder efficacy ratings by themselves.

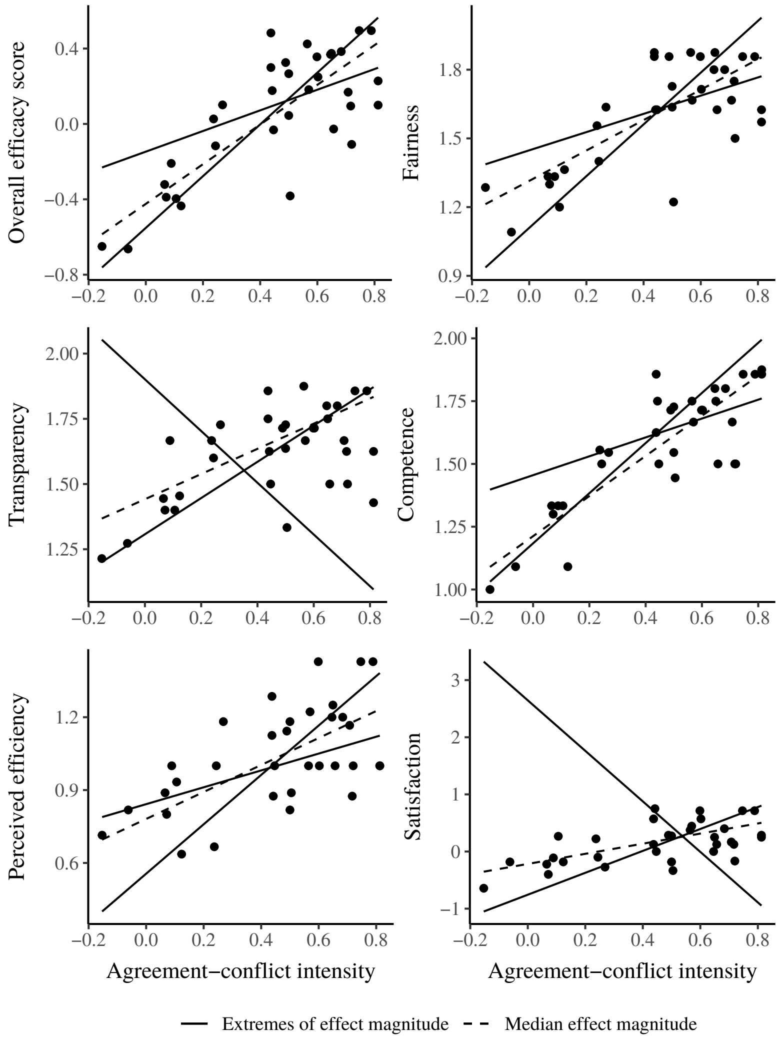
The non-existence of internal detractors and the very small number of external ones requires additional attention: Agreement/conflict intensity is indeed very robust to alternative specifications. To be reported as an individually significant determinant of stakeholder efficacy ratings requires substantial robustness already (see section 7.1.), but the fact that none of the internal and barely any of the external effects can reduce it in all theoretically possible variable combinations points to an extreme stability of the finding.

In summary, the intensity of agreement/conflict has a positive effect on stakeholder efficacy ratings: The greater the agreement (or the lower the conflict), the higher the efficacy of the authorization procedure as rated by stakeholders. The effect is large and very robust. There are no internal category detractors and only two external ones: the number of reservations in the construction permit and whether the project has undergone or will undergo a concentrated authorization procedure. While the effect of the intensity of agreement/conflict might directly drive the number of reservations in the construction permit, the detractor of the concentrated authorization procedure remains indirect.

Summary

The number of organizations, the number of veto players and reputational power scores have been shown to affect efficacy ratings by stakeholders negatively. Hence a higher number of participating organizations, a higher number

Figure 7.13: Stakeholder ratings by dependent variable. The independent variable measures the mean intensity of agreement ties (pos.) and conflict ties (neg.) averaged per project.



Notes: Dots indicate the bivariate distribution of observations. The regression lines indicate slopes depicting the most extreme and median slope estimates of the variable shown on the x-axis. These regression lines are drawn from the sample of those models in the ACMOI series that contain a significant instance of the variable in question.

of veto players or higher reputational power scores in a project arrangement reduce the ratings in all efficacy rating dimensions. Most importantly, however, the intensity of agreement (or the absence of conflict) makes for higher efficacy ratings in all dimensions. The magnitude of the effect is especially large for the latter item: A 1-SD increase in agreement intensity leads to an increase in overall efficacy by 85.5% of its SD. In comparison, an increase of reputational power by 1 SD "only" leads to a decrease of 52.8% of overall efficacy SD. The number of veto players and of organizations lead to a similarly sized decline in overall efficacy between -55.2% and -65.3% of their SD for a single SD-increase in the number of organizations or veto players (median effect size estimates).

The importance of the agreement/conflict variable is further underlined by its role as a detractor. While it is a detractor to the other three reported determinants of stakeholder efficacy ratings (number of organizations, number of veto players, reputational power), it is not detracted by any of them itself. The number of organizations, the number of veto players and reputational power scores each are detractors to the other two, along with other size-correlated measures such as degrees and density. Betweenness centrality in the trust/mistrust and collaboration networks also directly drives or is driven by the number of organizations and reputational power scores. Betweenness centrality in trust/mistrust and collaboration of the four main stakeholders decreases if the number of organizations in the arrangement increases and/or if reputational power in the arrangement becomes more sizeable. The four main actors thus lose brokering power in larger and more (reputationally) powerful networks, both regarding trust and collaboration.

Regarding category-external detractors, it is clearly the procedural policy rules that show some power in reducing the main variable's significance. The number of reservations in the construction permit and the status of whether the project underwent or is undergoing a concentrated authorization procedure are detractors to all four individually significant determinants of efficacy. However, both detractors are not explanatory factors of stakeholder efficacy ratings by themselves. The concentration status of the authorization procedure is not a direct driver of any of the four determinants: It unfolds its detractor power only in combination with other variables. In contrast, the number of reservations in the construction permit is a direct driver of the number of organizations and of the agreement/conflict variable. I maintain that this is the case because these reservations are written in construction permits as a result of conflictive issues during the authorization procedure. Conflict intensity, in turn, was found to be a driver of arrangement size and veto players, with both having self-standing negative effects on stakeholder efficacy ratings. For the number of organizations and of veto players and for reputational power scores, the extent of associational complaints is also an important detractor, reducing the significance of the number of veto players directly and the number of organizations and influence indirectly. As will be seen in the section on sectoral and procedural policy rules (see section 8.4.), this factor retains material and statistical significance as a direct and negative stakeholder efficacy determinant. Hence, the extent of associational complaints not only drives the number of veto players directly (positively) and the number of organizations and influence scores in combination with other variables, but it also directly affects efficacy as rated by stakeholders by itself.

7.5.2. Actor orientations

The category of actor orientation variables in series 7.2 contains single items of orientations and several orientation aggregates: a full orientations factor, a factor covering core orientations, one covering secondary orientations, a variable measuring mean proponent and opponent coalitions' full orientation scores by project, and a variable capturing their differences. Surprisingly, all disaggregated items, except for one, and all aggregated factors/variables passed the reporting threshold easily. All significant aggregated and disaggregated measures — from individual items asking whether WE-projects are worthy instruments to combat climate change or whether running turbines have negative consequences for residents in the vicinity, among many others — show increases of stakeholder efficacy ratings for an increase in pro-WE-orientations. The results further show that actor orientations explain stakeholder efficacy ratings very well: The significant *bivariate* models of the individual orientations show a median adjusted R^2 of 0.26 and the aggregated full orientations score a median R^2 of 0.32 across all stakeholder efficacy rating dimensions. This underlines the crucial impact of actor orientations for efficacy ratings. Based on the results, one could go as far as claiming that efficacy considerations and actor orientations are strongly overlapping if not — at least partly — the same.

For reasons of simplicity, only results of the two most important factors shall be reported here: the full actor orientations score and the score of differences between proponent and opponent coalitions' mean actor orientations. These are elaborated upon in the following.

Full actor orientation scores

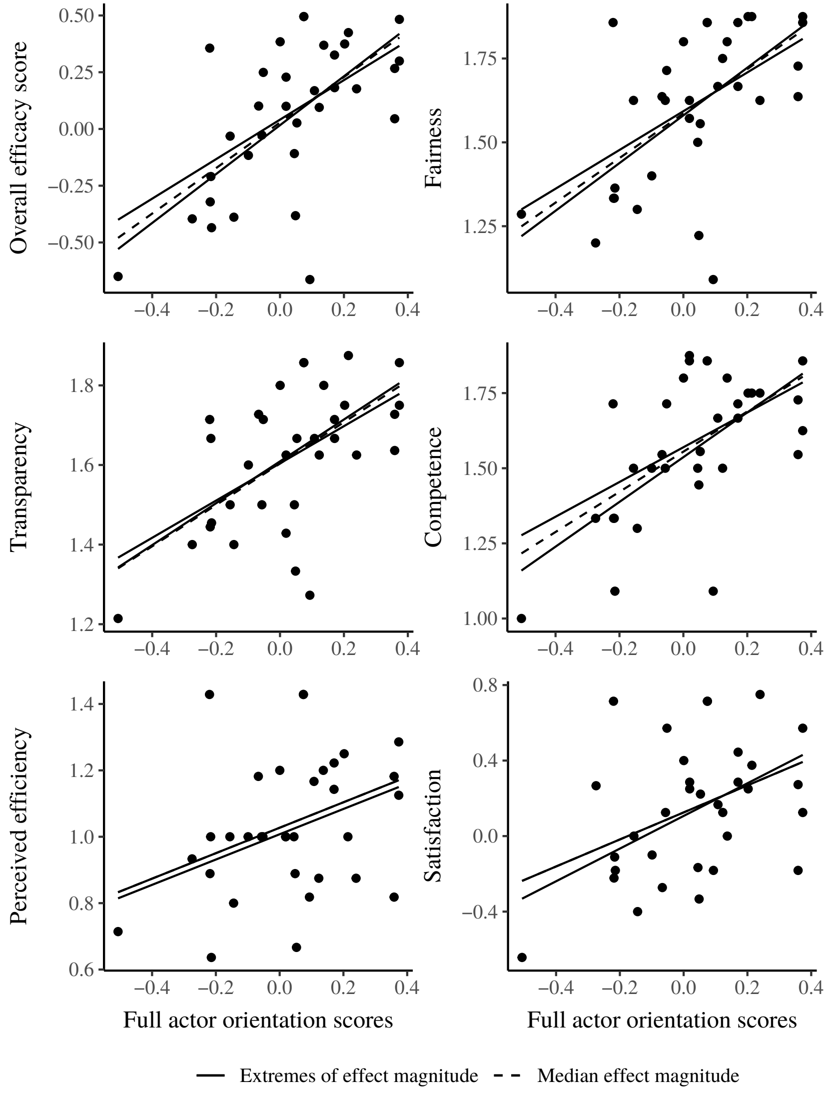
Combining all ten individual items of actor orientations into a factor (see table C in the online appendix), proponent orientations regarding WE (= positive factor scores) clearly have a positive impact on all effectiveness ratings by the stakeholders. Figure 7.14 pictures this relation against the five efficacy ratings by stakeholders and its aggregate of the overall efficacy score. Full actor orientation scores by WE-arrangement are concentrated: One added point denotes a change of 491.5% of its SD. The magnitude of effect sizes is rather large: A single SD for the full orientations score (+0.2 points) leads to an increase in 62.4% SD of the overall efficacy scores. This is a large effect. Although one cannot see it graphically, because scales are adjusted to fit each bivariate data cloud, median slopes have rather different effect sizes across the six efficacy ratings: The minimal effect size is given by the perceived efficiency rating, where a 1-SD increase in the full orientation score "only" leads to an increase of perceived efficiency by 37.1% of its SD. Effect sizes for the dimensions of satisfaction, fairness, competence and transparency are similar to the overall effectiveness score magnitude at SD increases of 56.3% to 59.7% for the same change in the full orientations score. Again, these are large effect sizes.

All but one items of the full orientations factor function as internal detractors to the full orientation score's positive effect on efficacy ratings by stakeholders.[243] Even derivatives of the full orientation measurement, such as mean coalition orientation scores (negative coalition: $\rho = 0.68, p < 0.001$, positive coalition: $\rho = 0.28, p > 0.1$) and their difference ($\rho = -0.58, p < 0.001$), show detractor power on the full orientation's positive effect on efficacy. All derivative measures would also pass the threshold to be reported as individually significant drivers of effectiveness dimensions by themselves. Hence, these measures both affect stakeholder efficacy ratings directly and, through the full actor orientations score, indirectly. The items and derivatives are direct (all but one) or combinatorial (mean proponent coalition orientation scores) detractors to the full actor orientations scores.

What is surprising, however, is that there are no external detractors that come even close to evincing sufficient detraction power. As an explanation, I suggest the prevalence of orientations for stakeholder efficacy: The tested decentralization and partisan conditions seem to be too far removed in a

243 This is not surprising as the items are components of the full factor.

Figure 7.14: Stakeholder ratings by dependent variable. The independent variable is the factor of "full preference scores".



Notes: Dots indicate the bivariate distribution of observations. The regression lines indicate slopes depicting the most extreme and median slope estimates of the variable shown on the x-axis. These regression lines are drawn from the sample of those models in the preference series that contain a significant instance of the variable in question.

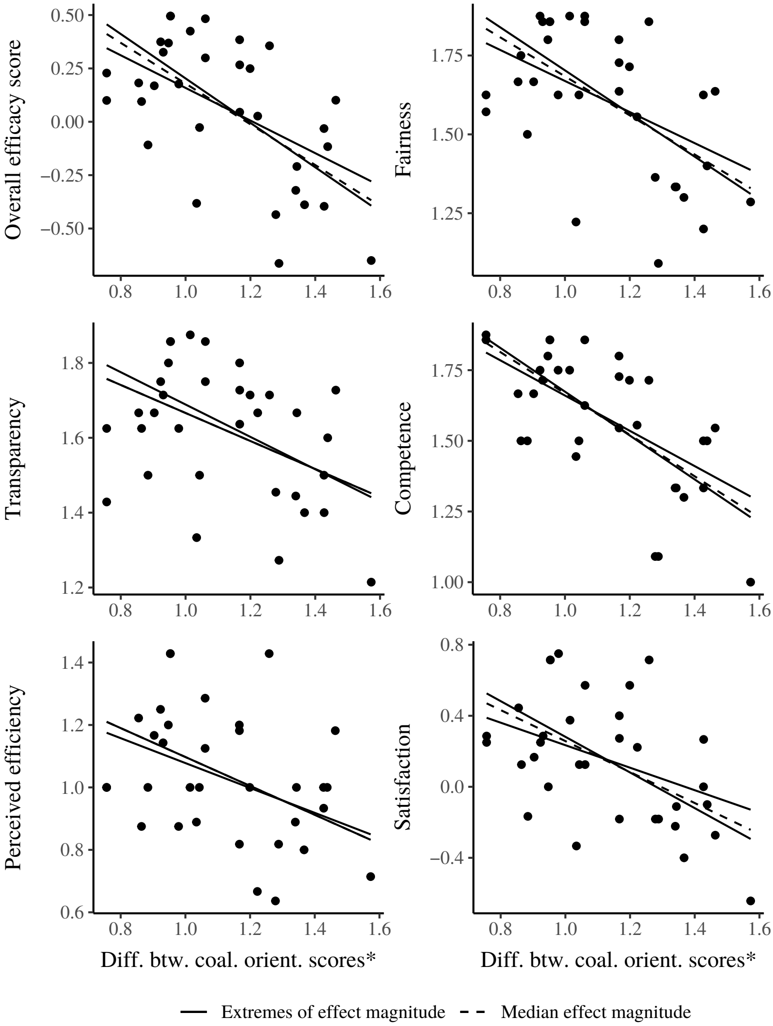
possibly causal chain to still demonstrate explanatory power. This is likely to be a statistical problem of actor orientations absorbing all the variance.

Differences between coalitions' mean actor orientations

Differences between mean coalition's orientations are also an important and self-standing determinant of all ratings of efficacy. Figure 7.15 shows that the effect of greater differences in orientations between opposing coalitions in each project has an unequivocally negative effect on effectiveness ratings by stakeholders. The coalition score means by projects are concentrated: The SD for the difference between them is only 0.219 points (median effect). The magnitude of effect for an added SD of orientation differences is a decrease of -63.9% of overall efficacy score SD. Median effect sizes for the other efficacy dimensions range between -43.7% and -68.3% for an SD-increase in difference. As seen with the full orientation score effects on stakeholder efficacy ratings, these are again large effect sizes. This lends important insights: The greater the differences between opposing coalitions in a project, the lower stakeholders rate the efficacy of the procedure. This could point towards differences in orientations serving as a source of conflict in authorization procedures, thereby lowering the efficacy of authorization procedures as rated by stakeholders.

All single items of the full actor orientations score, of which the difference measurement discussed here is a derivative, are detractors to it. All but one items are significantly correlated with it ($p < 0.05$) and, thus, direct effect detractors. In addition, all orientation score derivatives, such as full mean coalition scores (proponents: $\rho = 0.43, p < 0.05$, opponents: $\rho = -0.91, p < 0.001$), are also direct detractors to the significance of the difference score. Like for the full orientation score, none of the series' external category factors of partisan or decentralization conditions works as a detractor on the negative effect of greater difference in coalition orientation scores. As previously, I attribute this effect to the statistical models rather than to material denying of importance of external factors: Orientation scores simply seem to eat up all the variance to the detriment of possibly causally further removed factors.

Figure 7.15: Stakeholder ratings by dependent variable. The independent variable measures the difference between the full factor orientation scores of opposing coalitions.



Notes: * "Diff. btw. coal. orient. scores" stands for "difference between coalition orientation scores". Dots indicate the bivariate distribution of observations. The regression lines indicate slopes depicting the most extreme and median slope estimates of the variable shown on the x-axis. These regression lines are drawn from the sample of those models in the preference series that contain a significant instance of the variable in question.

Summary

All actor orientation measures, with minor exceptions that are not noteworthy, impact how stakeholders rate the efficacy of the authorization procedure. A stronger proponent orientation has a positive effect on how stakeholders perceive the efficacy of the authorization procedure. Proportionally, a stronger opponent orientation has a negative effect on perceived stakeholder efficacy. It has also been found that larger differences between the mean proponent and opponent coalitions' orientations in a WE-project are associated with lower stakeholder efficacy ratings: The further proponents and opponents "are away from each other" in terms of their mean orientations, the lower the perceived efficacy of the authorization procedure.

The finding is noteworthy because it highlights the close connection between efficacy perceptions and orientations. Theoretically and conceptually, efficacy and orientations are non-overlapping different concepts. Theoretically, nothing states that a stakeholder with stronger favorability towards WE in Switzerland would rate the efficacy of her projects more highly. She could just as well attribute lower efficacy because she knows everything that has gone wrong in her project. A person critical of WE in Switzerland could also rate the efficacy of an authorization procedure highly, maybe because it has been so slow and that was her aim, or because the project has incorporated many of her wishes. I would have expected no systematic relation and would have said that the criticality, with which one rates the efficacy of a project, is a matter or personality. However, this does not appear to be the case.

Instead, put succinctly, it appears that ideology drives what is considered to be effective. The extreme form of this argument — if the two were identical — would be troubling as it would state that there is no efficacy outside of ideological orientations. What would this say about human rationale and its capacity to integrate information that is non-conforming to one's ideology? Certainly, orientations and stakeholder efficacy ratings are "only" correlating strongly (R^2 of 0.26–0.32 for single item bivariate regressions) and are not "the same". Still, the robustness and strength of the relation is noteworthy. The connection might also have to do with the strong politicization of the issue — with proponents trying to confer a positive, and opponents a negative, image of a political issue.

Endogeneity is also an issue that should be reflected upon: I tested the notion whether orientations have an effect on efficacy ratings, but it could also be the inverse: How a stakeholder rates the efficacy of a WE-project where she is involved might also shape its more general orientations for WE in Switzerland. This is plausible to a certain extent: If a stakeholder, for example, considers the authorization of a specific project ineffective, her experience might shape how she views WE in Switzerland more generally. If this were the case, however, one would likely observe stronger divergences of orientations by project, with effective projects only having proponents, but this is not the case. As I have shown, the divide between pro and opponent coalition orientations is stable in magnitude across projects.

Regarding detractors, orientation scores have been shown to be extremely robust as there are no external detractors that reduce the significance of the orientation items to make them insignificant. Most items, however, function as internal detractors and correlate significantly with the main orientations variable under consideration. They are also individually significant predictors of stakeholder efficacy ratings themselves, meaning that almost all orientations measures can be said to detract from each other while at the same time (directly) determining efficacy ratings.

7.6. Comparing and interpreting efficiency and stakeholder efficacy ratings

It is now time to compare the results between efficiency and stakeholder efficacy rating models to arrive at some evaluation on the nature and strength of link 2 of the analytical model that is treated in this chapter. Table 7.5 summarizes the results for the two operationalizations of PSE, i.e. efficiency and stakeholder efficacy ratings. Looking at the table, there are three conspicuities that should be noted. First, relatively few concepts have effects across both measures of PSE: Only the size of the arrangement, the number of veto players and reputational power scores both affect efficiency and efficacy as rated by stakeholders simultaneously and consistently negatively. The second notable feat is that actor orientations only show effects on efficacy as rated by stakeholders. The third is that none of the concepts of modes of interaction, such as collaboration intensity or density, appear as significant determinants of these two PSE measures. These three conspicuities shall now be discussed in detail.

The size of the arrangement, the number of veto players and the extent of reputational power that is attributed to stakeholder in WE-arrangements have consistently negative effects on PSE. This is an empirical corroboration of the "institutional" or "competitive" veto points theory (Crepaz 2002; Vatter and Freitag 2007; Tsebelis 2002; Benz and Sonnicksen 2017; Scharpf 1976, 1988), which would foresee lower PSE for greater number of veto players. It also sides with the literature that has detected additional constraints for policy-making due to the federalist organization of a country (Braun et al. 2002; Fischer 2015b; Valentine 2010). For Switzerland, the finding also corresponds to the side of environmental federalism studies that finds a negative effect of a greater number of veto players on problem-solving (2000).

As arrangements size and the number of veto players are closely correlated ($\rho = 0.95, p < 0.001$), the lower PSE of more veto players could also be due to the larger size of the arrangement. The driving factor behind the negative effects of size could be larger transaction costs. But this presents a puzzle: I could not find consistent effects of higher collaboration intensity, density or degree which mean higher transaction costs. Alternatively, the negative effect of size could also be due to greater differences between mean coalition orientations. But these differences are not a determinant of efficiency.

Rather, results suggest that veto powers might be the reason behind the effect of the number of involved organizations on PSE: The fact that detractors show much stronger detraction effects on the number of organizations than on the number of veto players is suggestive of veto players being the "real driver" behind the effect number of organizations on PSE.

A further important finding has been the following: Greater differences in reputational power lead to lower efficiency but not to lower stakeholder efficacy ratings. This means that greater differences in reputational power present an obstruction to efficiency but do not impact how stakeholders rate the efficacy of the authorization procedure. This can be explained through the multitude of goals that are subsumed under the stakeholder efficacy ratings, where, e.g. for some opponents, inefficiency might be considered effective.

The same argument of the multitude of goals that are captured by the measurement of stakeholder efficacy may be made for trust density and intensity affecting efficiency positively, but not stakeholder efficacy. Hence, higher and more intense trust is associated with heightened efficiency but does not systematically impact what stakeholders think about whether an authorization procedure is going well. This stands in contrast with the intensity of agreement/conflict that is only positively associated with stakeholder efficacy ratings, with lower agreement (greater conflict) not showing an impact on efficiency.

How does this fit? Trust/mistrust intensity and agreement/conflict intensity are correlated strongly ($\rho = 0.61, p < 0.001$), and conceptually it is hard to imagine that trust only impacts efficiency and agreement only stakeholder ef-

Table 7.5: Significant determinants of two concepts of problem-solving effectiveness.

	Efficiency	**Stakeholder efficacy ratings**
	Actor constellations	
Number of involved organizations	Negative	Negative
Number of veto players	Negative	Negative
Reputational power scores	Negative	Negative
Difference between opposing coalitions' mean reputational power scores	Negative	
Trust density	Positive	
Trust/mistrust intensity	Positive	
Agreement/conflict intensity		Positive
	Modes of interaction	
N.A.		
	Actor orientations	
Individual orientation items (minor exceptions)		Positive*
Full scores		Positive*
Core scores		Positive*
Secondary scores		Positive*
Mean (full) proponent coalition scores		Positive*
Mean (full) opponent coalition scores		Negative*
Difference between (full and mean) opposing coalitions' scores		Negative*

Notes: * A positive relation means a positive controlled correlation with proponent orientations that have been set as positive (opponent scores are negative).

ficacy ratings. Based on the results, I suggest an interpretation of trust being a "deeper reason" behind agreement. I argue that respondents tend to remember concrete agreements and conflicts when evaluating the efficacy of projects, not the underlying trust. Furthermore, in line with the suggestion that stakeholder efficacy ratings capture multiple goals, it might also be the case that not all stakeholders seek trust in implementation arrangements. In any case, the differences should not be overinterpreted: Agreement/conflict is a significant detractor of trust/mistrust intensity, and, although agreement/conflict intensity is not a significant determinant of efficiency, an examination of its detractors shows that trust/mistrust intensity is a very strong detractor. Hence, the two determinants are strongly connected.

Actor orientations only show an effect — but a strong and unequivocal one on stakeholder efficacy ratings, not on efficiency. In fact, the results make it seem that measures of orientations and of efficacy ratings partly overlap: There are no external detractors (meaning no variables of a different analytical category as actor orientations that detract from the significance of orientation measures), and almost all orientation measures are significant and direct determinants of stakeholder efficacy ratings. For example, a stronger proponent orientation is conducive to higher efficacy ratings, whereas a stronger opponent orientation, but also greater differences in orientations between coalitions, are detrimental to efficacy scores.

But none of the orientations do impact efficiency, which seems at odds with their robust sizeable effects on stakeholder efficacy ratings. An explanation might be that coalition scores within projects are similarly distributed. In consequence, mean coalition scores are similar across projects, and even the size of the difference in orientation does not show great variance.[244] Hence, one could argue that orientations having no variance cannot explain differences in efficiency. Hence, this suggests that the orientations' non-effect on efficiency is more of a measurement problem than a material one.

From a perspective of rational choice — or at least bounded rationality (Simon 1957) —, which the ACI applies, the finding that orientations towards WE in Switzerland substantially drive the worth and value attributed to a single project is troublesome: It suggests that stakeholders evaluate a WE-project based on their orientations towards WE and not specifically based on the merit, worth and value of the WE-project itself. Moreover, the finding is

244 This might be due to the measurement that takes the mean and has little variance for this reason, but at the same time no individual orientation item is associated with efficiency either.

also suggestive of politicization of the issue: Proponents are likely inclined to overreport their favorability of a project because they want to correct for their expectation that opponents will overreport the negative sides (strategic reporting).

The third conspicuity is that none of the concepts of the modes of interaction (densities, degrees, intensity of collaboration) seem to matter for PSE. This relativizes a transaction cost story on WE-authorizations in Switzerland. In the present setting, positive or negative coordination did not prove to have an effect on PSE. The results suggest that concepts of the modes of interaction serve as a driver of actor constellation concepts, rather than being independent determinants of PSE themselves. Let me illustrate this point: The intensity of collaboration is a detractor to the PSE effects of the number of organizations and of veto players. Furthermore, the intensity of collaboration is a detractor to efficiency effects of trust density and intensity as well as to stakeholder efficacy effects of reputational power scores. It does not affect an efficiency or stakeholder efficacy determinant directly; in all cases it unfolds its detractor power through varying combinations with other variables. Hence, it would be wrong to state that concepts of modes of interaction have no effect — they simply work "on the side" and determine effects of actor constellation concepts together with other variables.

Before moving on to the next chapter that investigates the third link on direct effects between decentralization and PSE, a note on combining links 1 and 2 is in order. When doing so, an indirect link can be established between decentralization and both tested concepts of PSE. The following connections between links can be made: Perceived local autonomy, a measure of Mueller's (2015) polity dimension, has been found to have a positive effect on the number of involved organizations and of veto players. These, in turn, have shown a negative effect on efficiency and efficacy as rated by stakeholders. Perceived local autonomy can thus be said to have a negative indirect effect on PSE. In mediated models, perceived local autonomy has been shown to reduce agreement/conflict intensity and trust/mistrust intensity. Trust intensity has a positive effect on efficiency. As perceived local autonomy reduces it, the indirect effect on efficacy as rated by stakeholders is negative as well. Perceived local autonomy, in mediated models through trust, can be said to reduce efficiency. Perceived local autonomy also reduces efficacy as rated by stakeholders via increases in conflict acting as a mediator.

In the first link, many decentralization measures show positive effects on the modes of interaction variables of density of collaboration and the intensity of collaboration. Since these factors, in turn, could not be found to independently affect concepts of PSE, no second link can be "attached" to these findings.

Chapter 8: Link 3: Decentralization (and additional) effects on problem-solving effectiveness

This chapter is concerned with establishing the direct link in the present research project's intermediary variable design. After chapter 7 has answered the second part of the research question asking about effects of implementation arrangements on PSE, it is now time to investigate the overall relation that is implied in the research question, namely the direct relation between decentralization and PSE. This is depicted in figure 8.1 showing the focus of the present chapter in the overall analytical framework of this research project.

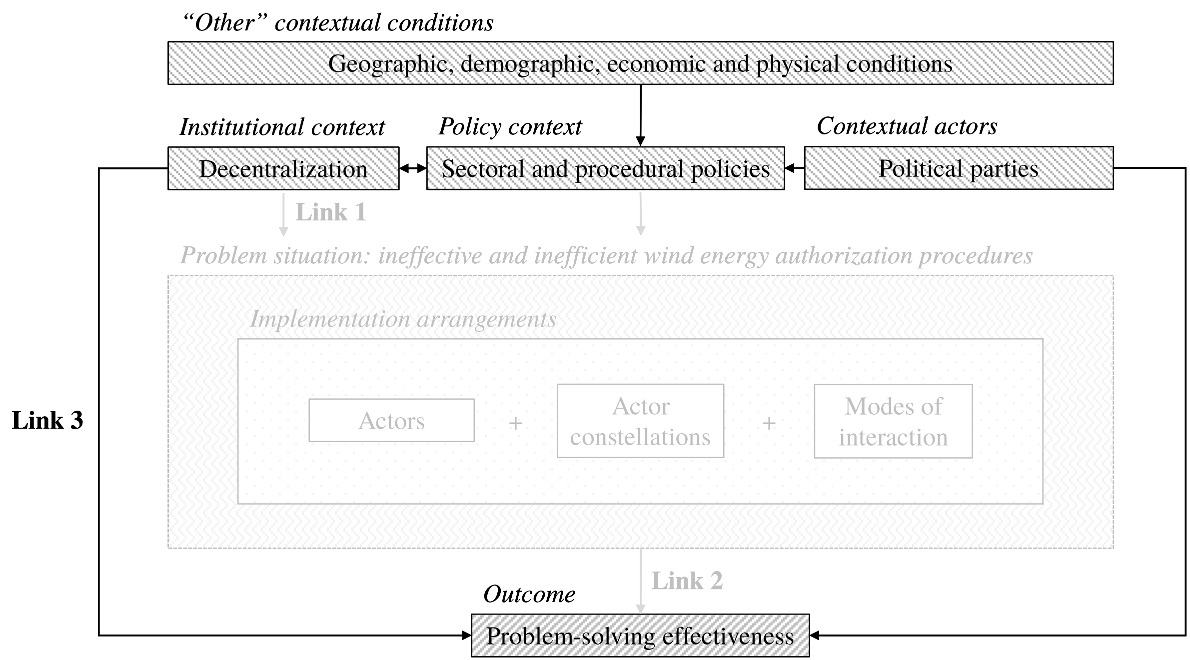
The chapter proceeds as follows: After a section (8.1.) focusing on the chapter's methods and data, the detailed results of decentralization effects are presented in section 8.2. Thereafter, detailed results of political parties effects are shown in section 8.3. Subsequently, effects of policy rules on PSE are described in section 8.4. A last section (8.5.) designed to compare and interpret the previously described effects will conclude this chapter.

8.1. Methods, data, and modeling strategies

To model the direct and overall third link between decentralization and PSE, this chapter ties together all three measures of PSE. In addition to the familiar measures of efficiency and stakeholder efficacy ratings from the previous chapter, the present chapter also adds "hosting probabilities" as a DV and third measurement of PSE. Hosting probabilities are an effectivity measure (see figure 3.3). They are measured using a dummy variable that captures whether a municipality or a canton is a host to a project (yes = 1) or if it is not (no = 0).

To test whether decentralization (institutional context) and political parties (contextual actors) make a difference for PSE, decentralization and partisan variables are regressed against these three DV-measures. Additionally, effects of sectoral and procedural policies (policy context) on efficiency and

Figure 8.1: Chapter 8 focus in the present study's analytical model.



Notes: Analytical categories indicated by rectangular boxes with different shading per category, labels in italics, material content in regular font, links of correlational association in bold font; grayed out is what is out of focus in this chapter.

stakeholder efficacy ratings, but not on hosting probabilities, are estimated.[245] In the models, geographic, demographic, economic and physical conditions (“other” contextual conditions) are included as control variables. Thus, all context conditions of the analytical model of this study (see figure 8.1) are being tested.

8.1.1. Data sources

Data sources differ by measure and series: Thus, there are three “groups” of models, one for each dependent variable, i.e. measures of PSE. Each group contains 3 to 4 series: There is a decentralization series, a partisan series on the municipal level, a partisan series on the cantonal level and a policy rules series. The policy rules series is only modeled in the efficiency and the stakeholder efficacy ratings group.

The dependent variable of efficiency — counting the number of months it takes to receive a project authorization — stems from the PCS (see section 7.1.1. for details). The dependent variable of stakeholder efficacy ratings is taken from the NCS (see section 6.1.1. for details) and then transformed into factor scores. Hosting probabilities, in turn, are secondary data based on identifying through PCS data which cantons and municipalities have been WE-hosts.

For the decentralization and partisan series, the IVs predominantly stem from secondary data. Control variables for these series mostly stem from the Federal Office of Statistics (BFS). Variables for the policy rules series are taken from the PCS. For the policy rules series, implementation arrangement aspects serve as controls that are taken from the NCS. Table B in the online appendix provides the detailed sources.

8.1.2. Modeling strategy

The overall third link of this study’s analytical model investigates effects of contextual variables on PSE concepts. The following stylized textual equations provide the series’ basic setup. The decentralization series can

245 The concept of hosting probabilities is tied to a level of government — either cantonal or municipal. Policy rules are compared across WE-projects. They are allowed to change within a canton across several projects.

be seen in equation (8.1), two different series on partisan effects (cantonal-partisan and municipal-partisan) are modeled based on equation (8.2), and the series on policy rules is based on equation (8.3):

$$E_{k\ OR\ i\ OR\ j} \longleftarrow decentralization_{i\ or\ j} + controls_{ikl\ OR\ jkl} \tag{8.1}$$

$$E_{k\ OR\ i\ OR\ j} \longleftarrow partisan_{i\ OR\ j} + controls_{ikl\ OR\ jkl} \tag{8.2}$$

$$E_k \longleftarrow SPR_{ik\ OR\ jk} + PPR_{ik\ OR\ jk} + cluster_{im\ OR\ j\ OR\ jm} \tag{8.3}$$

where:

E = efficiency / stakeholder efficacy ratings / hosting probability
i = canton
j = municipality
k = project
l = theme
SPR = sectoral policy rule
PPR = procedural policy rule

In contrast to the automated estimation for the series of the second link, here only the policy rules series was automated. The decentralization and partisan series do not have many independent variables of interest; hence, an automation was not deemed reasonable, as this would only have been a sensible choice if one can expect to cancel out configurational effects from summarizing. For these non-automated decentralization and partisan series, no detractor analysis is further conducted, the reason being the low number of variables of interest. For these series, robustness is checked by using alternative measures with similar meaning, provided that such measures exist. Moreover, the technique of stepwise deletion of covariates is used as a strategy of robustness checks. For the cantonal-partisan and the decentralization series in the hosting probabilities group, a reporting threshold of $p < 0.1$ is defined due to only having 26 cases and a full inventory. The municipal series of the hosting probabilities group are based on municipal comparison, using data from 1,830 municipalities, namely those that answered to Ladner et al.'s (2021) municipal secretary survey from 2017. Therefore, for the municipal level, the regular significance threshold of $p < 0.05$ is applied. The decentralization and partisan series in the efficiency group are based on the comparison of WE-projects, of which there are 85 cases. The regular significance threshold of $p < 0.05$ is also applied here. For the group of stakeholder efficacy ratings, there are only 30 projects, but the regular significance threshold of $p < 0.05$ is still applied because the ratings are based on a sample, not a census. For the decentralization and partisan series, only a single partisan or decentralization IV enters each model of the series.

The modeling strategy for the policy rules series follows the same estimation strategy as the two series from the second link (see section 7.1.2.). It is only tested in the efficiency and stakeholder efficacy ratings groups, not for the group of hosting probabilities models, as mentioned. Two sets are estimated for the policy rules series: a "full" one, which contains all possible combinations of sectoral and procedural policy rules (one of each in every model) as well as cluster controls[246], and another "internal" set. The internal set regresses only sectoral and procedural policy rules in all combinations between each other, ranging from 1-IV- to 5-IV-models (no permutations) and regressed against efficiency and stakeholder efficacy ratings. Each model in the full set, in turn, contains only models of 3 IVs: a sectoral, a procedural and a control variable. A detractor analysis is performed for both sets. The reporting threshold (% of models in which the variable must be significant at <10% across both the full and internal sets to report the model as significant) for the (8.3)-series is set at 70% for a maximal number of 27 models per variable. Especially for the Cox models that model efficiency, errors led to needing to discard a medium-high number of models. The total number of models estimated across both sets of the series and both PSE concepts is 14,567.[247] In total, 18 different independent policy rules variables were tested. Like for second link in the previous chapter, those IVs that managed to make the main IV insignificant in at least 50% of estimated models are reported as detractors to the main independent variable. Interpretation of detractors follows the rules established in section 7.1.2. Table 8.1 summarizes the third link's modeling strategy.
Although all sets follow a cross-sectional approach, each set employs a different estimation, diagnostics and graphing strategy: Because the dependent variable is binary for hosting probabilities, logistic models (Berkson 1944; Hosmer et al. 2013) with cluster-corrected standard errors by cantons are estimated. Clustered standard errors are only applied if the models contain mixed-level or municipal-independent variables. Predicted probabilities were then calculated and graphed.[248] To mode efficiency models and profit

246 For cluster proceedings, see footnote 217.

247 Total efficiency models in the full set: 259; total stakeholder efficacy rating models in the full set: 487; total efficiency models in the internal set: 1,205; total stakeholder efficacy ratings models in the internal set: 12,616.

248 All procedures were conducted using the statistical software *R* (R Core Team 2022). For estimations, handling and graphing, many different packages were resorted to:

from data censoring, the study employed Cox-proportional hazard models (Cox 1972, 1975) and applied the Efron method for handling ties in duration (Efron 1977). The models employ cluster-corrected standard errors by canton. Various survival curves graphical diagnostics were plotted to present these results.[249] For the models of the set of stakeholder efficacy ratings, standard multiple linear regressions with cluster-corrected standard errors by cantons were used. Graphs were then produced to show mean, median and/or extreme magnitude effects while keeping all other variables in the models constant at their mean.[250] In all modeling strategies, indicators that exist across time were averaged between 2000–2018. Independent variables were aggregated and averaged to fit the unit of comparison, which is either municipalities, cantons or WE-projects.

8.1.3. The series: controls, assumptions, levels

The decentralization and partisan series themselves require some explanation regarding the sets of controls employed. Because they are not automated, the inclusion of any controls require coherent theoretical derivation. Only real confounders should be included — it is imperative that only those variables are treated as controls that impact *the relation* between the independent variable and the dependent variable, not either the IV or the DV. That is, a confounder must impact both the independent and the dependent variable to be included as a control variable. The discussion shall begin with some important factors that should *not* be controlled for, even though some reviewers

For data and conditions handling, the *tidyverse* (Wickham et al. 2019), *purrrlyr* (Henry 2020), *catchr* (Burchill 2021) and *janitor* (Firke 2021) packages must be cited. For estimations, the *stats* package (R Core Team 2013) was relied upon. For clustered standard errors, I relied on the *sandwich* (Zeileis et al. 2020) and *lmtest* (Zeileis and Hothorn 2002) packages. For graphing, *ggplot2* (Wickham 2016), *ggpubr* (Kassambara 2020), *ggeffects* (Lüdecke 2018), *patchwork* (Pedersen 2017), *viridis* (Garnier et al. 2021) and *extrafont* (Chang 2014) were used. Finally, for LaTeX-compatible regression table extraction the *stargazer* package (Hlavac 2018) was employed.

249 To do this, I used the *survival* package (Therneau 2022) for estimation. For data, loop and conditions handling, the packages cited in footnote 248 were used. In addition to those packages cited in footnote 248, I used the *survminer* (Kassambara et al. 2021) and *ldatools* (Bender 2020) packages for graphing and exports into LaTeX.

250 The usual packages as cited in footnote 248 were relied on. Estimation of multiple linear regression can even be done in base-*R* (R Core Team 2022).

Table 8.1: Summary of link 3 modeling strategy.

Group	Set	Series	Comparison basis	Reported if
Estimated models				
Hosting probabilities		Decentralization	26 c.*	$p < 0.1$
		Partisan municipal	1’830 m. **	$p < 0.05$
		Partisan cantonal	26 c.	$p < 0.1$
Efficiency		Decentralization	85 p. ***	$p < 0.05$
		Partisan municipal	85 p.	$p < 0.05$
		Partisan cantonal	85 p.	$p < 0.05$
	Full	Policy rules	85/30 p.	$p < 0.1$ & 70%
	Internal	Policy rules	85/30 p.	$p < 0.1$ & 70%
Stakeholder efficacy ratings		Decentralization	30 p.	$p < 0.05$
		Partisan municipal	30 p.	$p < 0.05$
		Partisan cantonal	30 p.	$p < 0.05$
	Full	Policy rules	30 p.	$p < 0.1$ & 70%
	Internal	Policy rules	30 p.	$p < 0.1$ & 70%
Detractors to independent variables				
Efficiency	Full	Policy rules	t(res.)****	50%
	Internal	Policy rules	t(res.)	50%
Stakeholder efficacy ratings	Full	Policy rules	t(res.)	50%
	Internal	Policy rules	t(res.)	50%

Notes: * “c.” stands for “canton”. ** “m.” is short for “municipality/ies”. *** “p.” is an abbreviation of “projects”. **** “t(res.)” is shorthand for “transformation of model results”.

have suggested to do so — in my view, however, due to misapprehensions of the role of control variables.

A first factor to discuss is whether the WE-harvesting potential should be included as a control of PSE concepts in decentralization- and partisan-series models. Table 8.2 shows the necessary WE-contribution of cantons needed to fulfill the ES 2050. A higher potential to harvest energy from wind is certainly likely to impact the PSE. But this is not sufficient to be a confounder. For decentralization, the argument is as follows: It is hard to imagine that the harvesting potential affects decentralization. Wind speeds and wind heights are geophysical phenomena that have nothing to do with decentralization. As they are clearly exogenous to social systems and thus to decentralization, it cannot confound the *relation* between decentralization or political parties and PSE.[251]

For the partisan models, the question is whether the harvesting potential impacts both seat- and vote-shares as well as PSE. As argued, the harvesting potential impacts PSE, but how would it affect seat- and vote-shares of political parties? Wind speeds are barely known to a very small fraction of voters, which could theoretically base their election decision on this information. It is further the case that no canton has even got close to reaching the harvesting potential, so even if voters knew the potential of their canton, they are unlikely to have the harvesting potential — readily existing in all cantons — in mind when making a decision. What is more likely, but still unlikely given the knowledge on voter opinion formation, is that voters decide on which party to vote for based on the debates surrounding WE in their canton. Generally, Swiss voters tend to elect politicians based on multiple considerations of ideologies, issues and heuristics (see Tresch et al. 2020; Milic et al. 2014;

251 Nevertheless, the effect of harvesting potential on PSE concepts might be interesting nonetheless: By itself, the harvesting potential of WE is a driver of cantonal hosting probabilities. In a bivariate regression with the potential as an independent predictor of cantons hosting a WE-project, the result indicated a significant correlation at the 10% level. Harvesting potential increases predicted probability from less than 45% to over 95% on average if one compares probabilities of the lowest and the highest WE-potential. However, confidence intervals range from 20–70% at the lowest WE potential, moving to 50-–100% for the highest potential category; thus, the increase is non-negligible in size but is also not very large. For efficiency, a higher harvesting potential bivariately shows a reduced ($p < 0.05$) hazard ratio of experiencing the event of receiving a construction permit. For stakeholder efficacy ratings, it correlates significantly negatively (at least at $p < 0.1$) with the overall efficacy score, fairness, competence and satisfaction, but not with transparency and efficiency perception.

Table 8.2: Expected WE-contribution by canton to fulfill the Energy Strategy 2050.

Expected WE-contribution	**Cantons**
0–60 GWh/a	AG, AI, BL, BS, GL, NW, OW, SH, TI, UR, ZG
40–180 GWh/a	AR, GE, JU, LU, SZ, SO, TG, ZH
100–300 GWh/a	NE, SG, VS
260–640 GWh/a	FR, GR
570–1,170 GWh/a	BE, VD

Notes: Canton name abbreviations are explained in a separate section of the list of abbreviations. Table has been slightly simplified based on ARE 2020b, 26.

Lachat 2011, but also as described in the US-American classic by Campbell et al. 1960). But even if it were the case that a fraction of them decided based on the sole issue of WE in their municipality or canton, it is highly unlikely that this small minority of voters acts upon the information of the size of the harvesting potential. It is much more likely, for example, to base such a decision on the popular points of debate, such as WE's impact on avifauna. Hence, the WE-harvesting potential for cantons is not included in partisan models, because it is not a confounder.

Second, it should also be justified why it is not sensible to include electoral system controls in partisan models: On one hand, the electoral system determines whether and to which extent parties are represented in the cantonal legislatures and executives. They crucially determine to which extent and whether a smaller party can actually gain seats or not. On the other hand, it is very unlikely that electoral rules determine aspects of PSE other than through the relative power of parties. How could electoral system rules affect PSE of WE-authorization procedures independently? There is no argument that comes to mind. Logically, electoral system rules determine partisan composition, which in turn is expected to affect PSE, but no reason could be found how they could impact PSE otherwise. In consequence, cantonal electoral system rules are not confounders and will therefore not be included.

Moreover, when resorting to vote shares of parties in the National Council elections of 2015, the issue of electoral systems is further bypassed. These national elections follow a unified national voting system as codified in the Federal Act on Political Rights (BPR).

Nonetheless, the modeling strategy foresees that confounders vary based on the series, meaning on whether the models test decentralization or partisan effects and whether they are on the cantonal or municipal level. In the following, the control sets for the decentralization series models investigating decentralization shall first be elaborated upon, followed by explanations on the sets of controls of the partisan cantonal and partisan municipal models.

The decentralization series

Importantly and to start with, there is the cultural dimension of language that needs to be controlled for. Mueller (2015) found this to be the strongest determinant of cantonal decentralization. Language region affiliation could also be a predictor of PSE. This argument shall be illustrated empirically: 4.04% of all municipalities that are predominantly German-speaking host projects. In French-speaking municipalities, this percentage is 9.63%, so more than double the German-speaking rate, based on municipal counts from 2017 (BFS 2017). In other words, every 20th German-speaking municipality and every 10th French-speaking municipality is a host to a WE-project. Given the theoretical saliency, but also this observed empirical difference in hosting, language region affiliation could be a determinant of both decentralization and PSE. Thus, it needs to be controlled for.[252]

There are further demographic and geographic confounders that need to be accounted for. Population density and the size of cantonal surface area need to be included. Population density is important because of "territorial constraints": Where there are dense settlements, no wind turbine can be built, because they need a certain distance from settlements for reasons of their noise emissions and flickering light-and-shadow effects. Higher density thus reduces the probability of hosting. Moreover, population density could affect

252 The inclusion of a cultural factor in an ACI study that applies rational choice assumptions for actors could be criticized. However, this should not be problematic, as the rationality assumption is predominantly tied to the behavior of actors and not to the functioning of institutions. The ACI always had a broader than instrumental view of institutions (see section 2.1. and footnote 207).

decentralization scores, with more urban cantons and municipalities likely having different requirements in terms of local autonomy than more rural ones. Hence, it should be included as a confounder. However, it is argued that the density should be accounted for in interaction with the surface area of a canton or municipality. Rural and larger cantons are likely different from rural and smaller cantons regarding decentralization. Dense and large cantons as well as densely populated small cantons likely also face different decentralization challenges.

Cantonal decentralization, as conceived by Mueller (2015, 2022), the LAI (Ladner and Keuffer 2021) and fiscal measures by the EFV (2021) measures the extent of municipal powers relative to the extent of cantonal powers. Most indicators, with the exception of perceived local autonomy, are coded on the cantonal level. This means that a single value is attributed to all municipalities in a canton; hence, there is no difference between the municipalities of the same canton in these indicators. On which level should decentralization control variables be assumed? It is argued that they can only be included on the cantonal level, as decentralization is essentially a relative concept: The relevant points of reference for municipal margins of action are the cantonal preconditions. For example, whether a municipality perceives to have high or low local autonomy depends on whether the canton has accorded all its municipalities high or low local autonomy. Are there municipal confounders that need to be included? The author argues that this is not necessary, as all municipal-level effects that bring the canton to change its level of decentralization (and have a PSE impact at the same time) are included in the cantonal-level confounders. Thus all municipal-level indicators of decentralization are tested against cantonal control variables; with this, there is only one decentralization series per dependent variable.

Cantonal and municipal partisan series

Partisan models seek to find out whether political parties, conceptualized as contextual collective actors, influence the PSE concepts. Political parties are not part of implementation arrangements themselves; rather, they are expected to have indirect effects on PSE through their engagement and position (see section 4.4. for detailed theorizing). The expectation was that left parties are likely to be more in favor of WE-projects than center or right parties. A higher share of left parties in these three institutions is thus expected to be associated with higher hosting probabilities. Municipal executives are excluded from comparison because in most cases (except SO and FR; see Jeanneret and Moor 2016) the relevant decisions, especially the decision on the LLUPs, are made by the municipal legislatures. On the cantonal level, the following variables are tested: Cantonal vote shares in the 2015 National Council elections by nationalized parties and seat shares in cantonal parliaments (mean 2000–2018) and in cantonal executives (2000–2018) are investigated. On the municipal level, only municipal vote shares of national parties in the 2015 National Council elections are partisan variables of interest. These data serve as proxies for the political forces of the municipal legislature.

For the partisan series, there are three important assumptions that need to be made: First, political parties sharing the same label tend to have a very differently sized electoral base across cantons, and there is the question to which extent parties of the same name can legitimately be compared across cantons, because they play very different roles within cantonal institutions. In consequence, the cross-cantonal comparison is restricted to the set of those parties that are highly nationalized, following Bochsler et al. (2016).[253] The second assumption is that political parties of different cantons have the same programmatic direction, although in fact there is considerable programmatic diversity. While Giger et al. (2011) confirm that there is programmatic diversity, they also find that cantonal sections of the same party across cantons are more similar in their political programming than two different parties within (and across) the cantons. The causes of this programmatic diversity, as Giger et al. (ibid.) find, is population density and language region affiliation, which are confounders of the relation between political parties and PSE.

The third important assumption is that political parties actually may have partisan effects on policy-making. The literature on Swiss parties has maintained that their effects remain limited, either because organized interests take a much more prominent role (Kriesi 1980; Fischer 2012) or because partisan effects have been severely limited by institutional constraints (Arens 2020; Bochsler 2009; Thorlakson 2009). Nevertheless, given the changed circumstances of increased polarization in the Swiss party system of the last 30 years (Bochsler and Bousbah 2015; Traber 2015; Bailer and Bütikofer 2015; Vatter 2020), it is crucial to test it again, as the partisan hypothesis has

253 The selected parties have a nationalization score of greater than 0.5 in Bochsler et al.'s (2016) study on average between 2000–2018. An exception is made for the GLP that has passed the nationalization threshold of 0.5 only in 2011, because its promise of combining industrial development with sustainable development is central to the issue of WE considered.

been neglected in recent years (unless one counts partisan effects on cantonal intergovernmental cooperation; see Arens 2020).

In addition to maintaining these three assumptions, the partisan series require a discussion on possible control variables. As for the decentralization series, the variable of language region affiliation shall be discussed first. Regarding effects of regional language affiliation on political parties, Giger et al. (2011) have found that this affiliation is constitutive of party systems and party strengths across cantons. At the same time, it is likely that PSE is different across cultural regions as well. The reader is reminded that in the Romandie, approximately every 10th municipality hosts a project, while in the German-speaking part it is about every 20th. Hence, regional language affiliation should also be controlled for in the partisan series. Furthermore, Giger et al. (ibid.) have also detected that population density is a determinant of cantonal party systems. As it can be considered a likely determinant of PSE as well, it needs to be controlled for. The argument is the following: The denser the settlement, the less it is possible to build wind turbines. However, in contrast to the decentralization models it is argued that the size of the territory need not be included as a control, as there is no evidence of (absolute) territorial surface size influencing party systems in modern-day Switzerland — the possible pathways in which this could be an issue are already included through population size and density. Also in contrast to decentralization models, partisan models further need to control for population size, because it can be reasonably assumed that there are more divergent political orientations in larger populations, possibly leading to greater fractionalization of party systems under the condition of the electoral system allowing it. Regarding PSE, it is likely that higher population size puts greater pressure on cantonal authorities to get active concerning the deployment of RE. In essence, larger cantons have a greater responsibility to supply green electricity, and they likely act upon this larger or smaller responsibility differently.

Moreover, there is a voter group that needs special consideration regarding its role as a possible confounder: In WE-projects, farmers have played a crucial role in Germany(Langer et al. 2016), in the United States (Mulvaney et al. 2013) and also in Switzerland (Walter 2014). Their role as owners or leaseholders of large swaths of land confronts them with the issue of WE, for which often agricultural lands are re-zoned in special construction zones ("Spezialbauzonen"). Hence, farmers are disproportionately affected by WE in comparison to other professional groups. Moreover, farmers as landowners have the opportunity for financial gains if WE-installations are constructed on their lands; thus, their engagement influences the probability for a municipality and canton to decide to be a host. At the same time, farmers have a decidedly non-average voting profile — meaning that their share must be controlled for as a confounder in partisan models. Section 8.3.1. discusses the role of farmers in detail.

Overall, cantonal and municipal partisan models are controlled with the same control variables of regional language affiliation, population size, population density and the number of farmers, simply measured on the two different levels. There is only one exception on the municipal level, though, as the BFS' (2012) municipal typology is added to municipal partisan models. This typology variable is added because the municipal type can act as a municipal confounder, impacting both the party system of a municipality and PSE through its capturing of territorial differences. The typology attributes municipalities to classes from 1 (urban municipality with large agglomeration) to 9 (rural peripheral municipality).[254]

8.2. Decentralization effects

This section examines effects of decentralization by regressing decentralization against all three measures of PSE. It starts by looking at decentralization effects on hosting probabilities, continues with its effects on efficiency and, lastly, shows model results of its effects on stakeholder efficacy ratings.

8.2.1. On hosting probability

Decentralization effects on the hosting probability are measured cross-cantonally, incorporating aggregated municipal decentralization indicators as means per canton and cantonal-level controls. Thus, the number of cases to be compared is 26. Table 8.3 shows the relevant models.

Given the above-discussed set of control variables, these four indicators — perceived local autonomy (2017), polity decentralization, electoral decentralization and direct-democratic decentralization — showed to be significant.

254 The measure for number of farmers on the municipal level could not be used on the cantonal level due to problems of including the cantonal number of farmers in Cox estimations. Therefore, on the cantonal level, the measure of relative size of agricultural lands was used.

Perceived local autonomy is a component of the polity dimension of decentralization. Electoral and direct-democratic decentralization are components of the dimension of politics decentralization. The significance of the polity dimension for cantonal hosting probabilities is driven by the significance of its component of perceived local autonomy (Mueller 2015; Ladner et al. 2021), whereas the other component, Giacometti's classical legal autonomy categorization (1941), has no bearing on it. Compared to the politics dimension and the polity dimension, Mueller's third dimension of policy decentralization shows no significance, meaning that greater or fewer financial, personnel and administrative resources of municipalities have no impact on cantonal hosting probability. This is a crucial finding: In most WE-projects municipalities are offered financial rewards, often by an enlarged tax base through the founding of a local operating company in the municipality of the building site. Municipalities thus tend to profit financially if cantons are hosts, but municipal financial profit does not drive cantonal hosting probability. This is an indication that municipalities are not taking part in these projects for financial reasons.

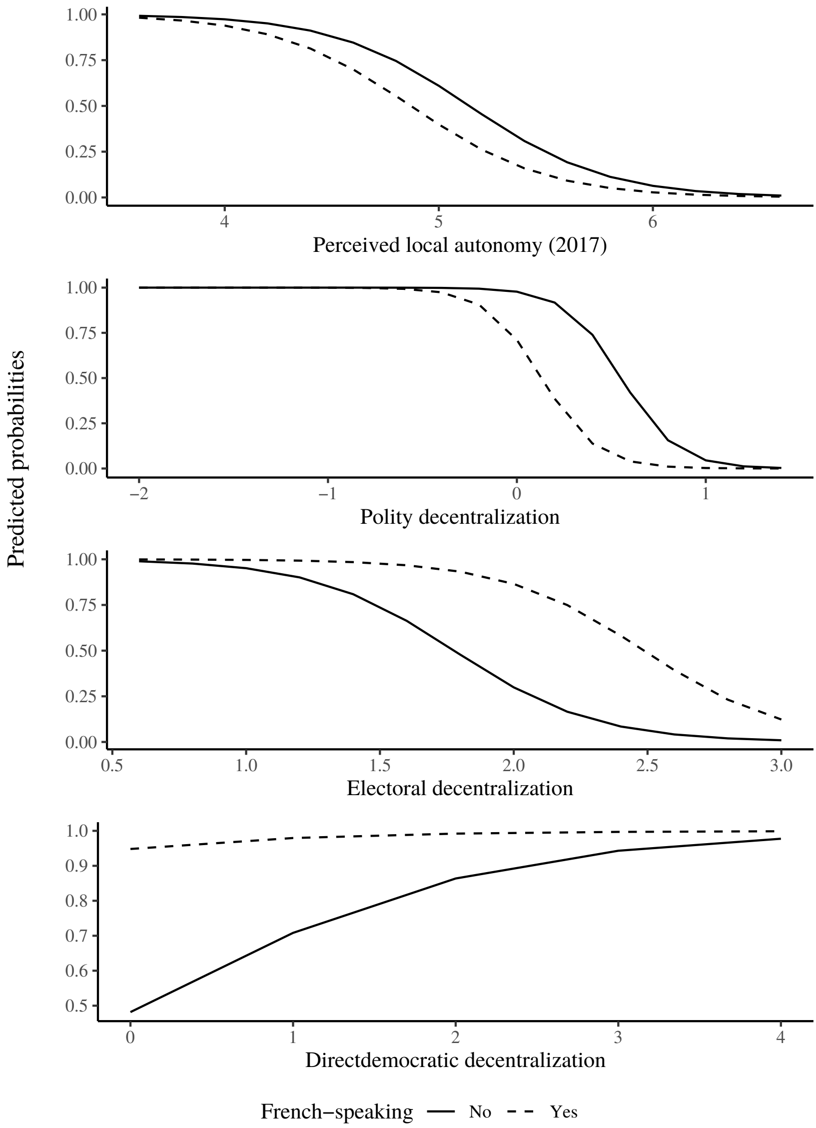
Regarding the politics dimension, two of its indicators, electoral and direct-democratic decentralization, show significant effects. Electoral decentralization is negatively and direct-democratic decentralization is positively related to the probability of a canton to host a project. Electoral decentralization refers to the extent to which municipalities and their citizens can influence and control (the outcomes of) cantonal elections. Direct-democratic decentralization, in turn, captures the extent to which municipalities and their citizens can impact and have control over the development of cantonal legislation (see section 3.1.2. for details on indicators).

In figure 8.2, I plotted predicted probabilities for (fully) French-speaking and (fully) Non-French-speaking cantons for each of the four decentralization variables that are significantly related to hosting probability. On the figure, one can see that the probability of a canton hosting a project decreases especially steeply over 2 units (27% of the observed range) of perceived local autonomy. The polity dimension decreases from 100% to 0% over about 50% of the range of the observed data. The politics indicator of electoral decentralization decreases the probability less steeply, as it decreases by 100% over 100% of the observed range. The measure of direct.democratic decentralization even increases half as steeply: over the full observed range of the data, the probability for a canton to host a project increases from almost 50% to 100%. All of these are very large effect sizes. This is due to the low

Table 8.3: Summaries of logit models. DV: efficiency; IV: decentralization.

	Dependent variable:			
	Hosting projects: yes = 1, no = 0			
	(1)	(2)	(3)	(4)
Perceived local autonomy (2017)	−3.140** (1.534)			
Polity decentralization		−6.828* (3.873)		
Politics: electoral decentralization			−3.825* (2.094)	
Politics: direct-democratic decentralization				0.960* (0.531)
French-speaking (ct.)	−0.858 (8.791)	−2.873 (81.785)	2.713 (7.713)	2.980 (3.310)
Cantonal population density (per km^2)	−0.004 (0.007)	−0.014 (0.018)	−0.007 (0.007)	−0.0003 (0.003)
Ct. territory (in km^2)	0.003 (0.003)	0.0004 (0.001)	0.001 (0.002)	0.005* (0.003)
Interaction of ct. pop. density with ct. territory	−0.00000 (0.00001)	0.00000 (0.00001)	−0.00000 (0.00001)	−0.00001 (0.00000)
Constant	16.818* (8.812)	6.390 (4.483)	9.484* (5.672)	−3.193 (2.196)
Observations	26	26	26	26
Log Likelihood	-6.052	-4.095	-6.926	-7.347
Akaike Inf. Crit.	24.105	20.190	25.851	26.695
Note:				*p<0.1; **p<0.05; ***p<0.01

Figure 8.2: Predicted probabilities of decentralization effects on the cantonal probability of hosting a WE-project.



Notes: Shown are marginal effects at the mean.

number of cases that make up the model, but it should not be a problem, as the models contain all 26 cantons.

For fully French-speaking cantons, the marginal effect of perceived local autonomy decreases more quickly than for the non-fully French-speaking cantons, but there is no large difference in predicted probability decline between the two cantonal groups. The difference in predicted probability of cantonal hosting is better visible with the more strongly decreasing marginal effect of polity decentralization. Here, the hosting probability of French-speaking cantons decreases about half a SD (z-scores) earlier. Put differently, French-speaking cantons, other model variables held at their mean, have the same probability of hosting a WE-project for lower values of the polity dimension scale. The slope is about the same in both cantonal groups, just with different starting points. This points to the fact that polity decentralization values in the Romandie are generally lower, but a differential interpretation is not sensible, as the slope of the decrease is largely the same.

For electoral decentralization, the cantonal hosting probability declines much later for fully French-speaking cantons than for the non-fully French-speaking ones. Again, effect sizes are similar, but the French-speaking cantonal probabilities begin to decline only about 1 point (not z-scores) later. This means that in fully French-speaking cantons the negative effect of higher municipal electoral control takes effect for much higher absolute values of the indicator. In other words, for a given degree of electoral control, the fully French-speaking cantons have a lower marginal reductive effect or an absolute higher probability of hosting.

The marginal effects plot of predicted probabilities of direct-democratic decentralization shows a decidedly different picture. Here, the slope (effect magnitude at a point) of the effect barely exists for fully French-speaking cantons but increases strongly for the non-fully French-speaking cantons. This indicates that for fully French-speaking cantons municipal control over cantonal legislation development does not matter as much as it does for the municipalities in the non-fully French-speaking cantons. In comparison to the predicted probabilities plots that showed similar slopes with different starting points across language regions, for direct-democratic decentralization one can really maintain that the effect is only relevant for municipalities in non-fully French-speaking cantons.

Greater polity decentralization and greater perceived municipal autonomy show negative effects on hosting probabilities, with different thresholds for French- and German-speaking cantons. Greater municipal power in these indicators is thus associated with lower cantonal hosting probabilities. This suggests that municipalities are not drivers behind a WE-project hosting effort in a canton. In fact, the opposite is the case: If a municipality has greater autonomy relative to its canton, meaning if a canton is more decentralized in its polity, then hosting becomes less likely. This might also explain the negative slope of electoral decentralization, where greater municipal control (and thus a higher value) is associated with a decline in predicted probability. For electoral decentralization, the greater the influence over cantonal elections, the lower the probability of a canton hosting WE-projects. In essence, when municipalities have more relative power, the hosting probability of cantons decreases.

This also suggests that it is the cantons that push WE-projects, not the municipalities. This story is nicely complemented by the positive slope of the predicted probabilities effect of direct-democratic decentralization. Municipalities in non-fully French-speaking cantons that have higher thresholds to contest cantonal legislation (and thus a lower value of the indicator) show a much lower probability to host projects than fully French-speaking cantons. For this group of cantons, one can observe that lower thresholds for contestation (and thus higher values of the indicator) are associated with increasing probabilities of cantonal hosting. I argue that this can be explained by risk: Lower thresholds to contest an unwanted cantonal decision facilitate experimentation. Municipalities take not as much risk when hosting, and they can always refuse if they find a lower number of supporters to do so. In this sense, municipalities in cantons with high thresholds to contest cantonal decisions are more likely to deny engagement from the start. I further maintain that in fully French-speaking cantons municipal risk-taking might not matter in the same way; in other words, risk might be culturally driven as well.

In summary, municipalities in cantons where they are granted greater autonomy see less need to get involved in WE-projects. Their polity protects them from needing to take action. The more they can influence cantonal elections, the lower the probability of cantonal hosting and of a push for WE-projects. Nevertheless, municipalities in non-fully French-speaking cantons that have greater capacities to contest cantonal decisions are more open to experimentation, so they can always refuse action by mobilizing only a small percentage of their constituents.

However, one should state that these effects are not particularly robust. Effects withstand partial deletion of covariates, and for perceived municipal autonomy its higher-level aggregate of polity decentralization points in the same direction. However, this should not mislead the reader into thinking that the overall phenomenon of decentralization has an effect or that the direct effects shown and explained above are highly robust. None of the alternatively tested LAI measures of polity decentralization, for example, showed significant effects that could further corroborate these effects.

8.2.2. On efficiency

The decentralization series in the efficiency group (based on equation (8.1)) estimated Cox-proportional hazard models with clustered standard errors based on cantons. The unit of comparison in the efficiency group of estimated models is the project, with 85 projects in the database (71 in the models). Table 8.4 shows the modeling results, once with the municipal type included as a control (1) and once without (2). In the first model, the hazard ratio for perceived local autonomy is $e^{-1.059} = 0.35$. As it is less than 1 and the coefficient is significant at the $p < 0.01$-level, perceived local autonomy is associated with a decreased hazard of having the event of interest. The event being the reception of a construction permit, higher perceived local autonomy is thus associated with lower efficiency in the authorization procedure. The percent change in the hazard is very large: Each additional point in perceived local autonomy (1.33 SD) is associated with a reduction of $(e^{-1.059} - 1) * 100 = -65\%$ of the hazard of not receiving a construction permit. This is a very large effect indeed. Effects in model 2 are a bit smaller but still very large, showing only a decline of -61.5% in the hazard rate for an additional point in perceived local autonomy.

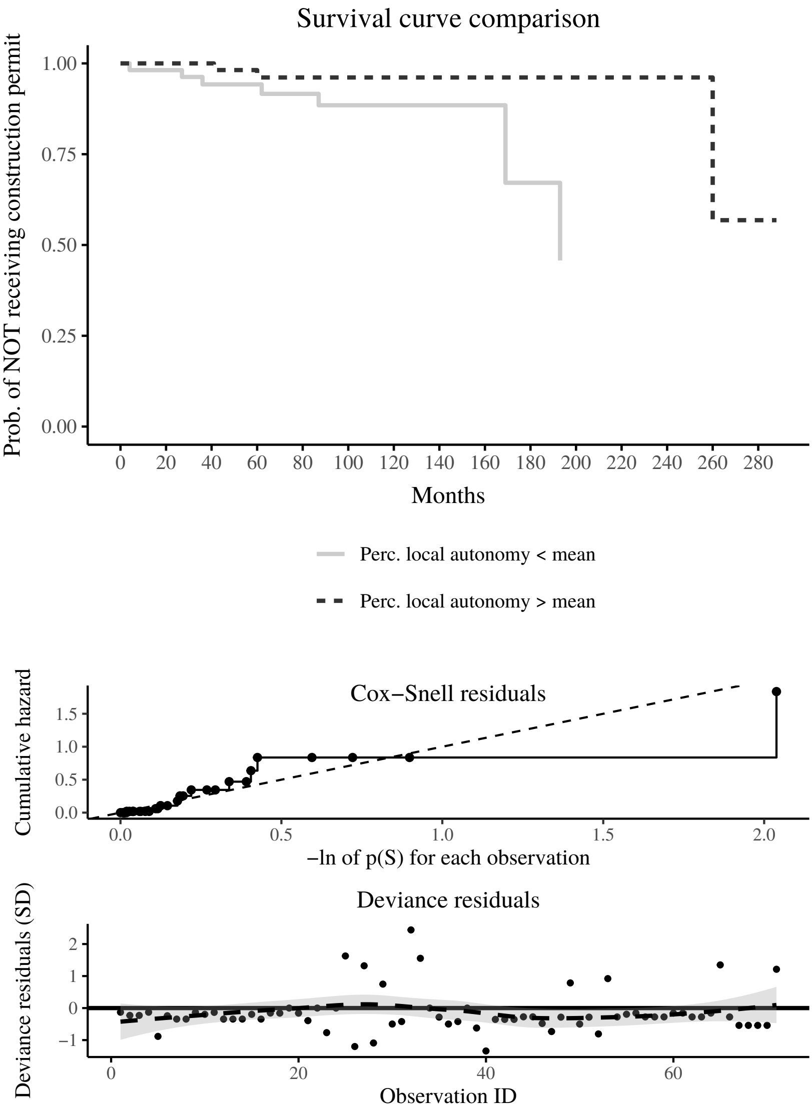
Figure 8.3 shows the survival curves for municipalities that perceive to have a below-the-mean local autonomy versus those that perceive to have an above-the-mean level. Cox-Snell and deviance residuals show an acceptable model fit. Compared to the baseline efficiency model in figure 7.3, the probability of getting a construction permit between months 160 and 200 for those with lower perceived local autonomy is similar. However, rather than low perceived local autonomy showing a positive effect on efficiency, having high local autonomy makes it much lower in terms of efficiency than the empty reference model. A stark increase in the probability of getting a construction permit occurs only about 80 months (6.7 years) later, at month 260. This is a very long chunk of time in the overall duration procedure. Interestingly, both curves never go to zero, meaning no curve shows certainty of receiving a construction permit at any point in time. This is due to the low number of events in the dataset.

Table 8.4: Summaries of Cox-ph models. DV: Duration; IV: Decentralization.

	Dependent variable:	
	Censored duration in months	
	(1)	(2)
Perceived local autonomy (2017)	-1.059^{***}	-0.955^{***}
	(0.457)	(0.420)
French-speaking (ct.)	−0.450	−0.257
	(1.005)	(0.941)
Cantonal population density (per km^2)	−0.007	−0.006
	(0.006)	(0.005)
Ct. territory (in km^2)	0.0001	0.0001
	(0.0003)	(0.0003)
Municipal type (2012)	−0.152	
	(0.210)	
Interaction of ct. pop. density with ct. territory	-0.00000^{**}	-0.00000^{**}
	(0.00000)	(0.00000)
Observations	71	71
R^2	0.213	0.207
Max. Possible R^2	0.601	0.601
LR Test	16.993^{***} (df = 6)	16.501^{***} (df = 5)
Score (Logrank) Test	15.404^{**} (df = 6)	15.328^{***} (df = 5)
Note:	*p<0.1; **p<0.05; ***p<0.01	

Notes: Standard errors reported in parentheses are cluster-corrected by cantons. Both models pass the proportional hazard assumption globally and for each IV individually ($p > 0.05$).

Figure 8.3: Survival curves and model fit graphs for the effect of perceived local autonomy.



Notes: For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean. The model fulfills the proportional hazard assumptions test.

This is evidence that at least mean perceptions of local autonomy show to have a negative direct effect on efficiency by decreasing the probability of receiving a construction permit at any point in time compared to those with lower perceived local autonomy. But again, a note of caution is in order: The relation is robust across stepwise deletion of variable, but it is not robust across alternative specifications of perceived local autonomy, such as Mueller's polity dimension of decentralization or the LAI's legal protection or administrative supervision items. Although I would argue that theLAI's alternatives are not fully equivalent measures, their strong conceptual overlap would allow them to function at least as partial robustness-check variables.

8.2.3. On stakeholder efficacy ratings

The third group of models tested effects of decentralization on stakeholder efficacy ratings. There are six different dependent variables: The overall efficacy factor score is the "factorized" combination of all five components that respondents rated individually. The five base components ask about fairness, transparency, competence of those involved, perceived efficiency and satisfaction with the (state of the) authorization procedure of a WE-project. Like for the efficiency models, the unit of comparison is the WE-project, not the canton or municipality.[255]

Perceived local autonomy (2017) and Mueller's (2022, 2015) personnel decentralization indicator of the policy dimension as well as his indicator of representational decentralization of the politics dimension have shown to be significant regressed against the overall efficacy factor scores. Table 8.5 presents summaries of these models. All other of Mueller's indicators have not shown to be significant and thus are not shown. Adjusted R^2 is generally low considering the high number of included controls, especially so for model 3). Perceived local autonomy (in model 1) and representational decentralization (in model 3) are negatively related to overall efficacy factor scores; personnel decentralization has shown to be positively related. All relations show to be significant at the 1%-level.

Personnel decentralization measures the relative number and salary of municipal staff compared to cantonal staff. Greater local personnel resources thus seem conducive to higher efficacy ratings by stakeholders. Represen-

255 All dependent variables have been transformed to z-scores and centered for variance inflation correction. Multicollinearity is acceptably low in all presented models.

Table 8.5: Summaries of multiple linear regression models. DV: Overall stakeholder efficacy ratings; IV: Decentralization.

	Dependent variable:		
	Overall efficacy factor scores		
	(1)	(2)	(3)
Perceived local autonomy (2017)	-0.128^{***}		
	(0.043)		
Policy: personnel decentralization		0.017^{***}	
		(0.006)	
Politics: representational decentralization			-0.880^{***}
			(0.228)
French-speaking (ct.)	−0.156	−0.056	-0.327^{**}
	(0.122)	(0.161)	(0.125)
Cantonal population density (per km^2)	0.0004	−0.0004	0.0001
	(0.001)	(0.001)	(0.001)
Ct. territory (in km^2)	0.00003	−0.00002	−0.00000
	(0.00004)	(0.00005)	(0.00004)
Interaction of ct. pop. density with ct. territory	−0.00000	−0.00000	−0.00000
	(0.00000)	(0.00000)	(0.00000)
Constant	0.671^{***}	−0.575	0.306
	(0.212)	(0.386)	(0.191)
Observations	33	33	33
R^2	0.317	0.312	0.243
Adjusted R^2	0.190	0.184	0.103
Residual Std. Error (df = 27)	0.299	0.300	0.315
F Statistic (df = 5; 27)	2.505^{*}	2.447^{*}	1.735

Notes: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$. Standard errors reported in parentheses are cluster-corrected by cantons.

Table 8.6: Excerpts of linear regression models by main IV and across multiple DVs of stakeholder efficacy ratings.

	Dependent variables					
	Overall efficacy factor scores	**Fairness**	**Transparency**	**Competence**	**Perceived efficiency**	**Satisfaction**
Perceived local autonomy (2017)	-0.128*** (0.043)	-0.147*** (0.051)	-0.127*** (0.033)	-0.099** (0.048)	-0.059 (0.038)	-0.073 (0.055)
Policy: personnel decentralization	0.017*** (0.006)	0.019*** (0.006)	0.010 (0.006)	0.019*** (0.005)	0.010** (0.004)	0.006 (0.007)
Politics: representational decentralization	-0.880*** (0.028)	-1.332*** (0.263)	-1.027*** (0.195)	-0.088 (0.280)	-0.634* (0.352)	-1.125** (0.522)

Notes: *p<0.1; **p<0.05; ***p<0.01. Each IV/DV-combination stems from a different model. Controls for each model include the variables of French-speaking (by canton), cantonal population density (per km^2), cantonal territory (in km^2) and an interaction of cantonal population density with cantonal territory. Standard errors reported in parentheses are cluster-corrected by cantons.

tational decentralization, in turn, captures the shares of elected municipal mayors that have mandates in cantonal legislatures as well. It measures to what extent municipal representatives may influence the cantonal legislature. This effect is strongly negative.

Table 8.6 shows these three IVs in models of all six measures of the dependent variable. Each combination of IV and DV shows a separate model, and simply all controls have been omitted in the table (see table 8.5 for the controls). The table shows that perceived local autonomy (2017) is negatively related to the overall efficacy factor scores, fairness, transparency and competence. For the efficacy dimensions of perceived efficiency and satisfaction, the sign of the effect is also negative but insignificant. The personnel-decentralization indicator is positive and significant for the overall efficacy factor scores, fairness, competence and perceived efficiency. It is not significant for transparency and satisfaction, but the sign is consistently positive across all DV measures. The indicator of representational decentralization shows significant effects at least at $p < 0.05$ on all efficacy dimensions but competence and perceived efficiency. However, their sign is also consistently negative.

The slopes of these models are also graphically depicted. Figure 8.6 shows the significant effect of perceived local autonomy on the four dependent variables of stakeholder efficacy ratings, on which it was significant at least at $p < 0.05$. The cloud of dots represents the bivariate distribution of scores by WE-project. The slopes represent the effect magnitude at any point over the values of perceived local autonomy on the four dimensions of stakeholder efficacy separately. For 1 SD of perceived local autonomy (1.33 points), a reduction on the overall factor scores and its components of -0.13 SD (on competence) to -0.2 SD (on fairness) is found. This is confirmed by the graphs, where the slopes for all components and the overall factor appear to be similar. Nevertheless, the two missing dependent variable components of perceived efficiency and satisfaction are insignificant. Hence, higher local autonomy does not go hand in hand with lower perceived efficiency of an authorization procedure or with lower satisfaction with it.

How can these results be explained? Higher perceived local autonomy has been found to be associated with a higher number of organizations involved in an implementation arrangement ($\rho = 0.32$, $p < 0.1$; see chapter 6). Results leave it open whether it is really perceived local autonomy or whether the driver of lower efficacy scores is due to its positive correlation with the size of the implementation arrangements. Larger implementation arrangements might induce a greater amount of “chaos” in project development, making it less fair, less transparent and more difficult to manage (competence).

Regarding the dimension of perceived efficiency, it seems striking that stakeholders “misperceive” the situation: The efficiency section (see 8.2.2.) showed that higher perceived local autonomy reduces efficiency. For efficacy ratings by stakeholders, one finds that stakeholders do not rate projects as having lower perceived efficiency when the municipalities are more or less powerful. I suggest that this is the case because, as shown previously (in section 7.2.), there is a certain disconnect between duration as efficiency and perceived efficiency.

The fact that stakeholders are not less satisfied in projects with more autonomous municipalities suggests that decentralization is not a direct driver of agreement and conflict intensity. This is in line with the finding from link 1 (section 6.3.2.), where perceived local autonomy only indirectly negatively affects agreement and trust through the size of the arrangement and the number of veto players as mediators.

Hence, knowing that there are important mediators between PSE-relevant aspects of implementation arrangements and decentralization, this makes the interpretation of the present results challenging: Projects in which municipalities are more autonomous were rated by stakeholders as less transparent, less competently led and less fairly conducted. But it is left unclear whether this is really due to local autonomy or not rather due to the larger size of the implementation arrangement that tends to be observed in arrangements where municipalities have greater autonomy.

Let us turn to examining the role of personnel decentralization graphically. Figure 8.4 shows an effect that is similarly sized as the one for perceived local autonomy: For an increase in personnel decentralization by 1 SD (= 11.21%), the overall factor scores and its components increase by 0.11–0.22 of their SD. The smallest effect is for perceived efficiency, the largest for competence and fairness.

Greater relative local staff resources thus make a project more effective from a stakeholder’s perspective. But they do not make an authorization procedure more transparent, nor are stakeholders generally more or less satisfied when staff resources change. This is an indication that municipal resources can be positive for the entire project, and, as an important stakeholder in the implementation arrangement, their resources have the capacity to make a difference. What is especially striking is that greater resources of municipalities lead stakeholders to rate the competence of how the authorization procedure is led more highly. In essence: Arming municipalities with greater resources

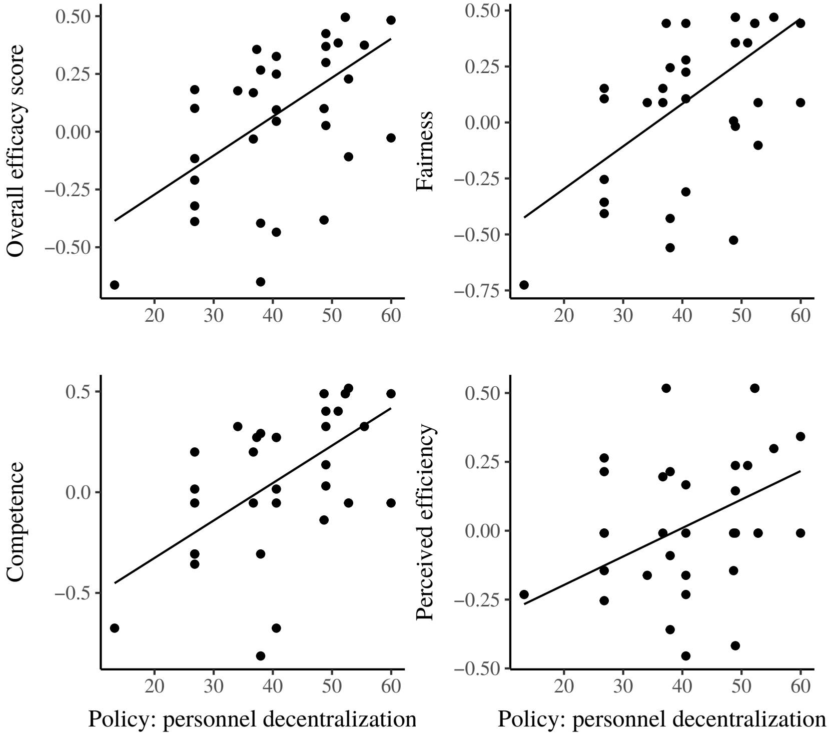
— and an assumed greater professionalization that might result therefrom — is an effectiveness-furthering idea in the eyes of the stakeholders.

Is this not contradictory to the above finding that greater autonomy leads to lower stakeholder efficacy ratings? One could argue that greater autonomy opens the space of possibilities for the municipalities to make a difference. Yet the argument does not hold up to empirical scrutiny. I checked whether the positive impact of greater personnel resources disappears if one controls for local autonomy additionally. It does not, the positive effect of greater personnel decentralization remains. This means that, given any degree of local autonomy, it is still positive for stakeholder efficacy ratings when municipalities have greater resources. This suggests a certain "compensation effect" of greater local resources against the loss in stakeholder ratings due to greater perceived local autonomy.

Regarding representational decentralization, the effect has been found to be negative. Figure 8.5 shows a decrease in four of the six stakeholder efficacy dimensions. Compared to the magnitude of the effect of personnel decentralization, the effect of representational decentralization is about half the size: For an increase in 1 SD of representational decentralization (-0.086 points), the different stakeholder efficacy dimensions decline by -0.08 SD to -0.11 SD. But is the effect interpretable? The bivariate distribution shows that the effect is driven by two outliers. In consequence, I must suggest to temper the interpretation or declare the effect materially void if the effect is outlier-driven. Hence, I regard it as more careful to declare the relation void for all four significant effects of representational decentralization on stakeholder efficacy.

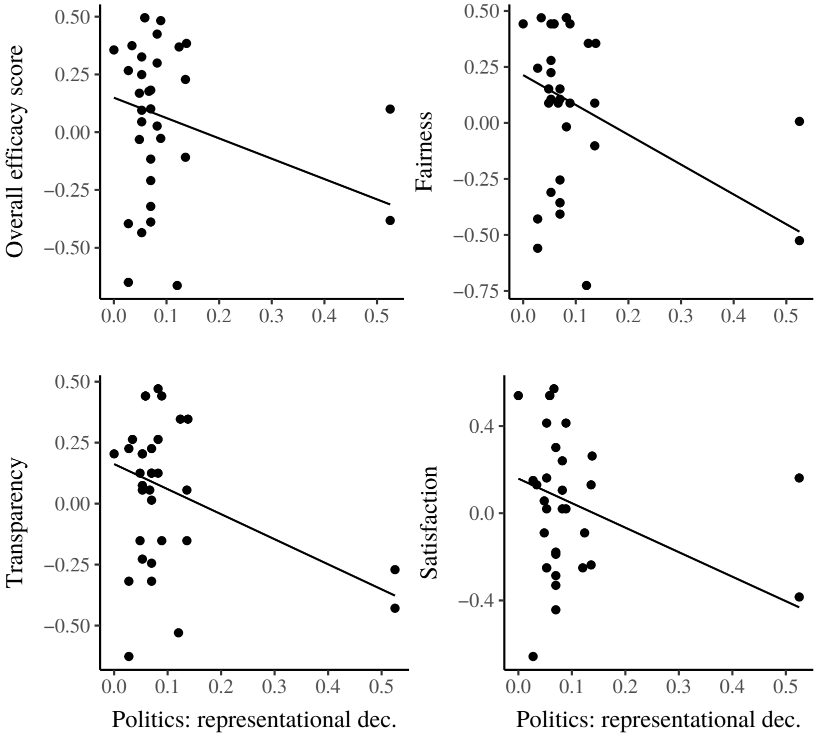
Like for the effects on the other two measures of PSE, effects on stakeholder efficacy ratings withstand the stepwise deletion of control variables for robustness. But there are no alternative measures of the LAI that could be understood as significant substitutes. For example, legal protection and administrative supervision as polity measures cannot confirm a significantly robust effect of the polity of decentralization being negatively related to stakeholder efficacy ratings. Neither do all other measures of decentralization that have not been talked about here have an impact. Hence, one cannot speak of an overall direct effect of decentralization on stakeholder efficacy ratings. Rather, I can only claim a direct effect for the indicators discussed as they have been measured by Mueller.

Figure 8.4: IV: policy dimension indicator of personnel decentralization; DVs: all significant stakeholder efficacy rating dimensions.



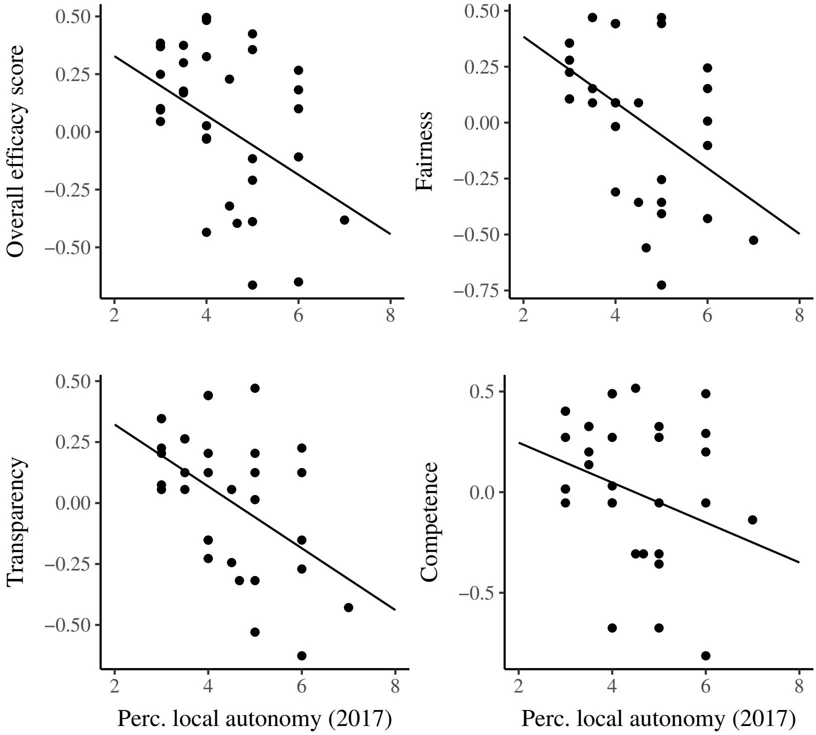
Notes: Dots indicate the bivariate distribution of observations. The regression line indicates slope depicting the estimated effect of the variable shown on the x-axis. Other independent variables are held constant at their mean.

Figure 8.5: IV: politics dimension indicator of representational decentralization; DVs: all significant stakeholder efficacy rating dimensions.



Notes: Dots indicate the bivariate distribution of observations. The regression line indicates slope depicting the estimated effect of the variable shown on the x-axis. Other independent variables are held constant at their mean.

Figure 8.6: IV: perceived local autonomy; DVs: all significant stakeholder efficacy rating dimensions.



Notes: Dots indicate the bivariate distribution of observations. The regression line indicates slope depicting the estimated effect of the variable shown on the x-axis. Other independent variables are held constant at their mean.

8.3. Political party effects

In this section, I shall report partisan effects in two series, a municipal and a cantonal one, across three groups of models, one for each measure of PSE. These groups, by order of reported succession, are the hosting probability models, the efficiency and the stakeholder efficacy ratings models.

8.3.1. On hosting probability

Results of the hosting probabilities group in the partisan cantonal series shall be presented first. Thereafter, I shall describe the results of the municipal-level partisan series.

Cantonal level

This series tested the argument of whether the relative strength of political parties' vote- and seat-shares has an impact on the probability of a canton hosting a WE-project. The answer is simple: They do not. Of all possible partisan effects — from the vote shares of all nationalized parties by canton in the National Council elections 2015 to their seat shares in cantonal parliaments and executives — none appeared statistically and/or materially significant.

Materially, this non-finding can be interpreted as a resounding "no" for those cantonal (nationalized) parties that claim to actively impact cantonal hosting conditions for WE-projects favorably or unfavorably. At least in the tests within this series, no party can be said to contribute to creating more favorable or more unfavorable cantonal hosting conditions, even though the main lever to do so is arguably in the competence of the cantons, not the federation.

Municipal level

The partisan municipal series could not test for as many indicators as the partisan cantonal series, because of issues of inter-municipal comparability between political parties. Because the most important institution to be scrutinized on the municipal level is the legislature (assembly), I opted for the national vote shares of nationalized parties by municipality. This serves as a proxy measurement of the political composition of the municipal legislature (assembly). The unit of comparison in this series is the municipality. Hence, depending on the model, the regressions contain around 1,730 municipalities, which represents 76.7% of all municipalities in Switzerland in 2017 (reference date: 1.1.2017, BFS 2017).[256] The municipal secretary survey is thus a sample coming very close to a census and may be interpreted as such, as the authors maintain (Haus 2021, 7). Hence, there are no biases to be expected resulting from sampling.

The models in table 8.7 show that there is one significant result: A higher vote share of the SVP in a municipality is associated with a higher probability of a municipality being a host (model 1). The negative coefficient of the GLP is only significant at the 10%-level, but this is insufficient given the number of cases in the dataset. This result clearly goes against the expectation in the literature of green and left parties being favorable to WE-projects. I shall now examine this result in detail.

In the control variables that are all highly significant except for the municipal type, the variable that checks for the number of farmers in a municipality stands out: Why does it need to be included? In fact, the role of farmers in WE-projects is a peculiar one. For one, on the municipal level there is a clear correlation between the number of people working in agriculture and municipalities hosting projects ($\rho = 0.27$, $p < 0.001$). There is also a highly significant positive correlation between the relative size of agricultural lands and municipalities hosting projects ($\rho = 0.29$, $p < 0.001$).[257] The projects need land, often a bit outside a village on hillsides and hilltops, because of the required minimum wind speeds. In other words, suitable territories are often agricultural lands. But what does this have to do with the SVP being positively related with WE-hosting on the municipal level?

Data from the Swiss election studies ("Selects", Tresch et al. 2021) show that farmers indeed have strongly non-average political party preferences in Switzerland. Figure 8.7 shows that farmers have tended to elect representatives of the SVP comparatively more often than the mean of other professions. The pattern is visible in all National Council elections since 2003: Solely by itself, the party has received about half of the farmer vote except in 2011. In comparison, for all other professions, the SVP-vote hovers around 20%. The CVP has also carried more electoral weight with farmers than the party has done for voters from all other elections. What stands out further is that

256 The official response rate is 82.2% (Haus 2021, 4), from which some municipalities had to be discarded due to missing data

257 Spearman's rank correlation between the cantons hosting a project and the number of people working in agriculture is insignificant with a ρ of -0.09 (p = 0.69). Neither is the size of a canton's agricultural area significantly related to cantons hosting projects: Spearman's rank shows a ρ of 0.19 (p = 0.37).

Table 8.7: Summaries of logit models. DV: hosting probability; IV: partisan variables on the municipal level.

	Dependent variable:					
	Hosting projects: yes = 1, no = 0					
	(1)	(2)	(3)	(4)	(5)	(6)
Municipal vote share of SVP	0.019***					
	(0.007)					
Municipal vote share of FDP		−0.019				
		(0.014)				
Municipal vote share of GLP			−0.123*			
			(0.069)			
Municipal vote share of CVP				−0.012		
				(0.007)		
Municipal vote share of SP					0.019	
					(0.014)	
Municipal vote share of GPS						0.023
						(0.024)
French-speaking (ct.)	1.341***	1.266***	0.945***	1.015***	0.933***	0.939***
	(0.248)	(0.248)	(0.221)	(0.200)	(0.215)	(0.216)
Municipal population (2014)	0.00002***	0.00002***	0.00003***	0.00003***	0.00002***	0.00003***
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)
Municipal population density (2014)	−0.002**	−0.002**	−0.002*	−0.002**	−0.002**	−0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No. of people employed in agriculture (2013)	0.003***	0.003***	0.003***	0.003***	0.004***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Municipal types (2012)	0.006	0.023	0.027	0.023	0.052	0.036
	(0.057)	(0.058)	(0.061)	(0.059)	(0.057)	(0.060)
Constant	−3.825***	−2.950***	−2.603***	−2.901***	−3.549***	−3.235***
	(0.580)	(0.515)	(0.558)	(0.527)	(0.539)	(0.528)
Observations	1,857	1,815	1,618	1,806	1,825	1,738
Log Likelihood	411.406	404.525	-356.365	-409.627	-413.981	-398.467
Akaike Inf. Crit.	836.813	823.049	726.729	833.254	841.963	810.935

Notes: *p<0.1; **p<0.05; ***p<0.01. Standard errors reported in parentheses are cluster-corrected by cantons.

voting for the SP is almost three times as common with voters from other professions than with farmers.[258]

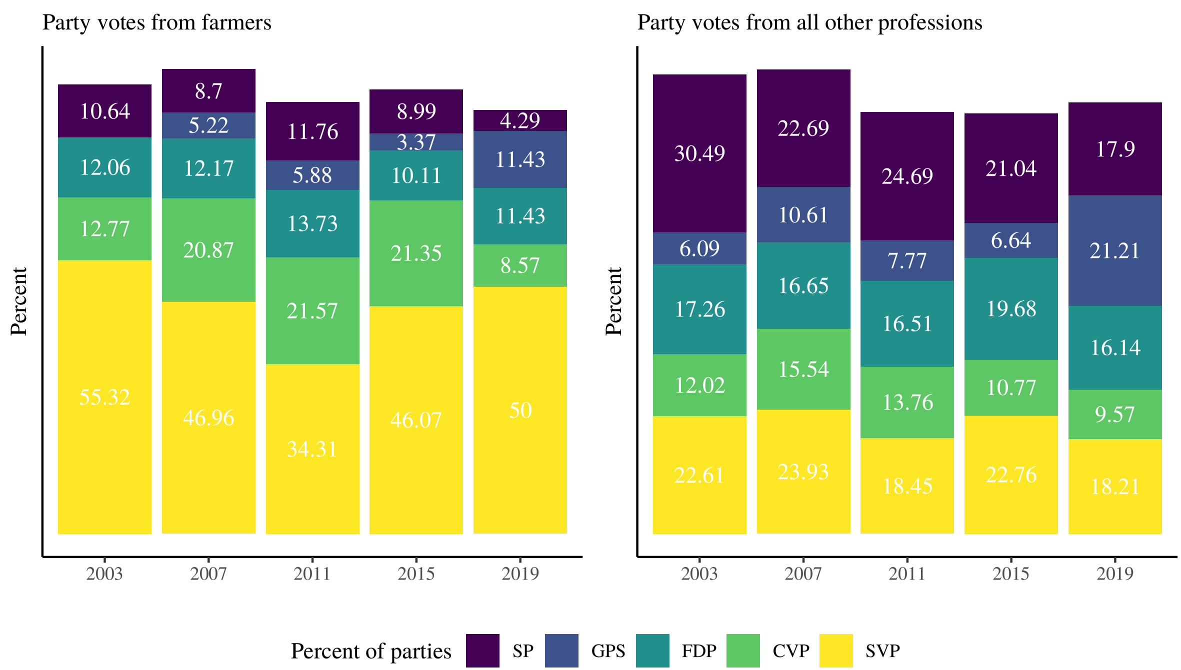
Hence, I argue that the positive effect of the SVP vote share on municipal hosting probability is driven, at least partly, by the farmer's vote in municipalities (the farmer control variable is also significant at the $p < 0.001$ level). Where there are many farmers, there is a higher SVP vote share. And this higher share is associated with higher "WE-friendliness" of the municipality. The results thus seem to suggest that farmers are significantly more open to hosting renewable-energy installations than the mean municipal population. This is not entirely implausible, as the program "Agrocleantech" of the Swiss Farmer's Union (2022) shows.

Figure 8.8 shows the marginal effects of the SVP vote share in fully French-speaking cantons versus those in non-fully French-speaking cantons on the probability of a municipality hosting a project. The graph shows a steeper slope — and hence a stronger marginal effect — for the municipal vote share of the SVP in fully French-speaking cantons. But it departs from a higher probability when the SVP vote share is 0. Over the range of 0%–75% of the vote share, the increase is about 15% in predicted probabilities, whereas for the non-fully French-speaking cantons the increase over the same range is barely 2%–3%. Hence it appears as though even partisan effects are different across language regions.

Nevertheless, it should not be forgotten that municipal vote shares of all other nationalized parties did not show effects on municipal hosting probabilities, which is unexpected. A branch of the literature on the politics of RE has sought to provide an explanation for this, subsumed under the label of the "green-green" dilemma (Tafarte and Lehmann 2023; Santangeli et al. 2016; Dulluri and Raţ 2019; Jackson 2011): Studies have found that there is a trade-off between importance attributed to biodiversity and importance accorded to the construction of larger industrial facilities of renewable-electricity generation. It seems likely that these trade-offs have led to party-internal discord on the sustainability effects of large-scale (industrial) infrastructure projects, and I suggest it as the main reason why left, and especially green, parties are

258 Importantly, all of these data stem from the survey of the Swiss election study (Tresch et al. 2021), which asks a representative sample of citizens for whom they voted and what their profession is. This graph *does* diverge from official party strength data in the form of official results due to divergences of the representativeness of the "Selects" sample with the actual voters. Nevertheless, these data are the most reliable possible indicators of voter choice by profession that exist in Switzerland.

Figure 8.7: Political party votes cast by farmers vs. cast by citizens of all other professions.



Notes: Because I excluded parties that are not highly nationalized according to Bochsler et al. (2016), the bars do not stack up to 100%.
Source: own representation using the “Selects” cumulative dataset by Tresch et al. 2021.

not engaged in a statistically detectable manner. If the political left is split due to said dilemma, it is the political right and the center — not subject to this dilemma — where effects should be detectable. The SVP vote share effect is robust to model specifications and stepwise variable deletion, yet there was no alternative item available with which I could have checked for further robustness.

8.3.2. On efficiency

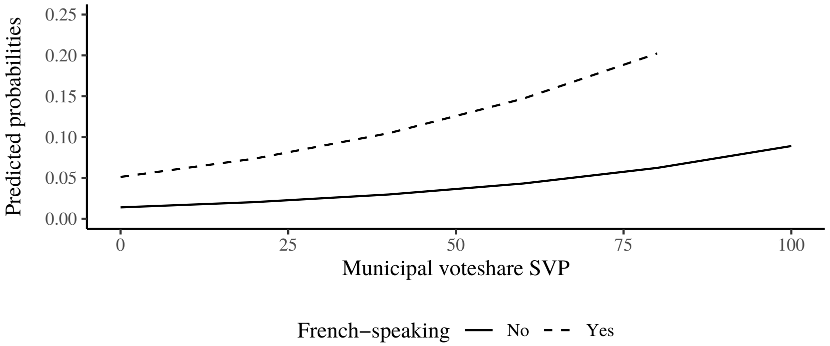
The partisan cantonal and partisan municipal series in the efficiency group of models tests whether, and to which extent, partisan effects on efficiency can be found. It first discusses the results of the cantonal partisan series and then dives into results on the municipal level.

Cantonal level

In contrast to the partisan cantonal series of the hosting probability group, the same series in the efficiency group compares projects (n = 85), not cantons. All independent variables are on the cantonal level except for the dependent variable, which is on project level.

Whereas the partisan cantonal series of the hosting probability had no significant effects to report, here, in the efficiency group, there are quite few. Table 8.8 shows these five models. Number (1) tests the cantonal vote share of the SP for the National Council election 2015. Vote shares for all other highly nationalized parties (GPS, CVP, FDP, SVP and the GLP as an exception) did not turn out as significant determinants of a WE-authorization procedure's duration. A higher cantonal vote share of the SP is thus associated with lower efficiency. I also checked the extent to which parliamentary seat shares by party across 2000–2018 show an effect. Model (2) shows that the share of the SP is again negatively related to efficiency. The CVP's seat share has a positive effect on efficiency, as seen in model (3). A summary variable of left parties in cantonal executives, capturing the seat share of the SP, the GPS and other smaller left parties, also shows a negative effect on efficiency (model 4). In model (5), a positive effect of the ideological spread in said cantonal executive has been discovered. A larger left-right distance in the cantonal executives is associated with higher efficiency. In a simplified summary, the

Figure 8.8: Predicted probabilities of the partisan effect of the size of the SVP vote share on the municipal probability of hosting a WE-project.



Notes: Shown are marginal effects at the mean.

left detracts from efficiency, whereas the center in parliament and larger ideological spread in the cantonal executive help promote it.

For the left, with the SP being its largest component, the negative effect, based on its vote share, its seat share in parliament and its seat share in the cantonal executive, is robust. For the CVP, neither its vote share on a cantonal level nor a center-effect in the cantonal executive appears as significant. Its effect can therefore not be interpreted to be as "generic" as the SP/left effect.

Regarding the negative effect of the left in cantonal executives on efficiency, I also checked whether a higher share of GPS executives does have an effect by itself. It does not, only the SP share does. Hence, there is general evidence for a left-party effect, driven by SP and not GPS members in the cantonal government. However, it does not make a difference whether a left, center or right executive is in charge of the influential position of head of construction department. This is surprising given its significance in the comparison of means between the cantonal hosts and non-hosts (see section 5.5.). Yet it is likely the case that any potential effect would be fully canceled out by the cultural factor of French-speaking cantons having more left-party government members. Digging deeper, I found that the share of left parties in the cantonal executive correlates with network size ($\rho = 0.6, p < 0.001$), with the number of veto players ($\rho = 0.71, p < 0.001$) and with agreement/conflict intensity ($\rho = -0.61, p < 0.001$). Considering the issue, I regard it as likely that a higher share of left-party cantonal executive members plays a role in driving up the size of implementation arrangements, the number of veto players and the intensity of conflict. The more intense the conflict, the more veto players and the higher the number of organizations — and the conflict gets more intense if more left-party members are at the executive table.

The positive effect of an ideologically more diverse cantonal executive is astonishing, as diversity is conventionally associated with greater conflict. But this does not seem to be the case. One explanation could be to say that no, greater ideological diversity does not mean more intense conflict in the implementation arrangement. This is supported by the data: In fact, a significant positive Spearman's rank between more intense agreement and greater ideological spread can be found in the data ($\rho = 0.39, p < 0.05$). It could thus be argued that oversized coalitions in the cantonal executive are associated with "kinder and gentler" implementation arrangements — at least from this superficial, quantitative-statistical point of view. A second possible explanation could be that a cantonal executive's ideological spread is associated with more intense conflict only in the cantonal executive, without spreading to the other participants in the implementation arrangement. Hence, it is also conceivable that greater conflict, contained within the cantonal executive, leads to greater efficiency.

Before graphing probabilities, I shall briefly interpret the hazards: Table 8.9 shows the hazards, hazard ratios and associated percentage changes. The hazard ratios compare the change in hazard of receiving a construction permit for each unit change in the independent variable. For example, having a 10% share of the SP in cantonal parliaments is associated with a decline of 31% of risk of receiving a construction permit compared to those cantons with a 9%-share of the SP in cantonal parliaments. What stands out in table 8.9 is the seemingly incredibly high risk-increasing factor of the ideological spread in the cantonal executive.[259]. The high percentage are partly due to the low SD of the measure, where an additional point in the scale of the ideological spread represents 2.1 SD. But even then, the "positive risk" remains enormous. But also the other effect sizes are very large indeed, considering that a 1-unit change in the vote share/seat share variables is only a single percentage point.

As a final step of the interpretation, I shall present a survival curve and associated model fit. I shall only present the most conservative estimate of the left/SP-effects, the share of left-party cantonal executives (other graphs

259 I checked whether there are estimation errors or assumption violations. There were none

available upon request). For better depictability, I made a dummy of the share with the mean of the left-party cantonal executive share as the cut-off point. This is a reductive procedure, as it does not capture the extremes and reduces all variance into a dummy. Still, figure 8.9 shows a clear separation in the survival probability between the two groups. The survival curve of the group of projects, in which the cantonal executives have a higher-than-mean share of the left in cantonal executives, only shows an increase in the probability of getting a construction permit (or a decline in the probability of not receiving one) at around month 270, or around 22.5 years. The other group starts to have an increase probability starting at around one year and a large drop at around months 170 (14.1 years) and 190 (15.8 years). Compared to the baseline graph (see figure 7.3 in section 7.4.), the results of the projects with below-the-mean left shares in cantonal executives show a comparable baseline in the earlier months and a much higher probability of receiving a construction permit in the months 160–200. The Cox-Snell and deviance residuals show a good fit of this partisan cantonal efficiency model. In terms of robustness, the estimates show stable significance across stepwise deletion of most added controls, but I have not resorted to alternative measures to testing the relations presented.

From a point of view of interpretation, it is astonishing to find a complete absence of effects of the GPS. Given the GPS' flagship topic of climate change and sustainability, why does no effect show in the data? As briefly suggested when I discussed the municipal vote shares in the hosting probabilities group (in section 8.3.1.), I interpret this finding as evidence of a "green-green" dilemma (Tafarte and Lehmann 2023; Dulluri and Raț 2019; Jackson 2011): Green voters and representatives are fully divided between supporting the drive towards greater renewable electricity and supporting, at the same time, strict biodiversity and conservation measures.[260]

As a driver behind the push for stricter projecting requirements and higher sustainability of infrastructure, I suggest the role of participation promotion. Greater participation has been heralded as a panacea (Schweizer and Bovet 2016, 68) to solve impasses in infrastructure planning, and I regard it as likely that the GPS, who is the traditional "issue-owner" of green development (Lüth and Schaffer 2022), has pushed strongly for greater participation: In Switzerland, the identity of the GPS very much focuses on being a "grass-roots" and "participatory" party (Ladner 2008) as opposed to the other parties

260 The null-finding of the GPS together with the predominantly negative effects of the SP is not easy to square. I will attempt to do so in section 8.5.2.

Table 8.8: Summaries of Cox-ph models. DV: efficiency; IV: partisan variables on the cantonal level.

	Dependent variable:				
	Censored duration in months				
	(1)	(2)	(3)	(4)	(5)
Cantonal vote share of SP	-0.192^{**}				
	(0.151)				
Share of seats in ct. parliament: SP		-0.374^{**}			
		(0.237)			
Share of seats in ct. parliament: CVP			0.061^{***}		
			(0.038)		
Share of left party cantonal executives				-0.125^{***}	
				(0.065)	
Ideological spread in cantonal executive					3.320^{**}
					(2.052)
French-speaking (ct.)	0.345	3.167	−0.324	2.158^{**}	0.497
	(1.364)	(3.384)	(1.146)	(1.887)	(1.298)
Cantonal population (2017)	-0.003^{**}	-0.005^{***}	-0.003^{*}	−0.0001	−0.001
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Cantonal population density (per km^2)	−0.008	0.001	−0.006	-0.005^{*}	-0.007^{***}
	(0.005)	(0.011)	(0.006)	(0.005)	(0.005)
Cantonal agricultural area in km^2	0.049^{**}	0.023	0.049	0.007	0.040
	(0.037)	(0.068)	(0.036)	(0.038)	(0.032)
Observations	72	72	72	73	73
R^2	0.133	0.222	0.189	0.192	0.189
Max. Possible R^2	0.549	0.597	0.597	0.592	0.592
LR Test (df = 5)	10.307^{*}	18.097^{***}	15.046^{**}	15.525^{***}	15.332^{***}
Score (Logrank) Test (df = 5)	10.068^{*}	17.081^{***}	15.288^{***}	18.557^{***}	15.499^{***}

Notes: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$. Standard errors reported in parentheses are cluster-corrected by cantons. PH-assumption: yes.

depicted by the GPS as “elitist” and centrally organized (Ladner 2016), even if the GPS does not have a participatory “edge” over other parties in reality (ibid.). This self-understanding might still lead the GPS to push for greater civil-society inclusion in larger infrastructure projects. Moreover, it is the core supporters of the GPS — the environmental associations — that stand to benefit from participation promotion. Hence, participation promotion is a matter of extending influence and, put negatively, an opportunity for clientelism. This argument might be valid for the entire left, not “just” the GPS, although the self-understanding of, e.g., the social democrats is less “grassroots”, even though, based on recent findings (Lüth and Schaffer 2022), it is about equally “green” in ideology.

Municipal level

From the municipal partisan series in the efficiency group, two findings may be derived; models (1) and (3) in table 8.10 show them. The municipal vote share of the SVP and of the SP are associated with a 7% decline and a 12% decline in hazard ratio, respectively, for a 1% increase in the share of each.[261] Again, these are large estimates. No effect could be shown for the FDP and the GPS. The model containing the GLP vote share could not be presented because it did not converge, while the CVP vote share model did not pass the global proportional hazard assumption. The model fit is rather poor, with R^2's of 5%–13% for 6-covariate models. Robustness is better for the SVP vote share, which is consistently negative across stepwise deletion of covariates. The effect of the SP is contingent upon the municipal type and becomes insignificant otherwise.

Whereas the SVP coefficient and hazard ratio is negatively associated with efficiency, it could be shown to be positively associated with municipal hosting probability. But this seems plausible if one considers the driving force of hosting probabilities being farmers — who above-the-average vote for the SVP; however, farmer-hosting is not associated with efficiency, as I found an absence of a significant effect for all efficiency models of the covariate of the number of people in the municipality working in agriculture. There is no prima facie reason why farmer-initiated projects would undergo a more efficient authorization procedure than others. Furthermore, what is telling is that no party that I could test on the municipal level is

261 $(e^{-0.075} - 1) * 100 = -7\%; (e^{-0.126} - 1) * 100 = -12\%$.

Table 8.9: Hazard coefficients, ratios, and percentage change of the hazard in cantonal partisan efficiency models.

Independent variable (IV)	**Hazard ratio**	**% change of the hazard ratio***
Cantonal vote share of SP	0.83	-17%
Share of seats in ct. parliament: SP	0.69	-31%
Share of seats in ct. parliament: CVP	1.06	+6%
Share of left party cantonal executives	0.88	-12%
Ideological spread in cantonal executive	27.67	+2,677%**

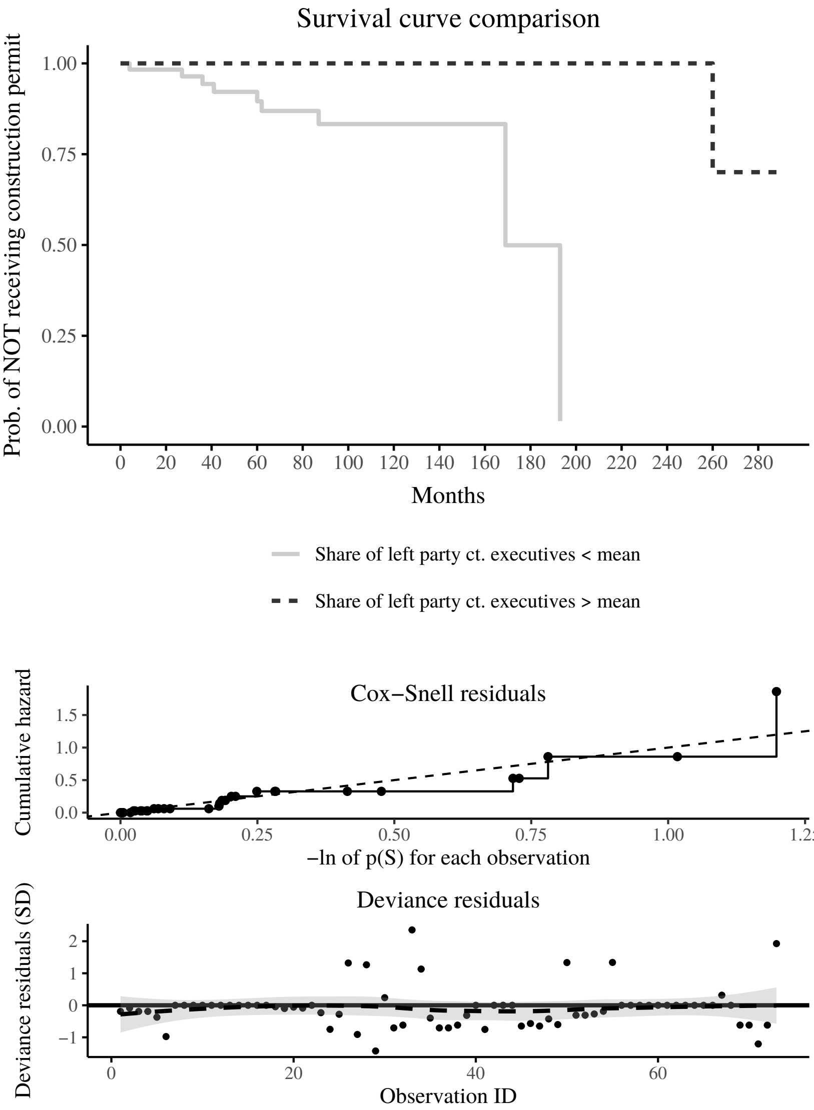
Notes: * The % change of the hazard ratio is interpreted for a 1-unit change in the independent variable. ** 1 point in added ideological spread (scale 1–3, ordinal, averaged by project and across the years 2000–2018) captures 2.1 SD of the observed range.

systematically and positively associated with efficiency. In other words, no party has systematically engaged itself on behalf of WE-projects in Swiss municipalities regarding efficiency. It is difficult to picture why this might be the case, as there were positive effects on the cantonal level. I can only speculate: Is it because the (fear of) risk of electoral punishment is much greater in municipalities and is greater for proponents than opponent? This might be a pathway of interpretation, which, unfortunately, I cannot test.

I shall now depict the survival curve of the municipal vote share of the SVP because it is the smaller estimate of partisan effect size; the SP vote share graph is available upon request. In comparison to the baseline survival curve, the effect on the probability of receiving a construction permit is the same earlier in time or is higher for the same point in time. Having a low vote share in the municipality of the SVP is thus associated with an increase in efficiency as compared to a high vote share, for which there is a clear decrease in efficiency compared to the baseline. Again, the graph is limited in its depiction because the strata shown are dummies using the mean as a cut-off point, not the extremes. As can be seen with the Cox-Snell and deviance residuals, model fit is good.

In summary, the SVP and the SP vote shares in a municipality (as tested with their vote shares in the National Council elections 2015 on the municipal level) are detrimental to efficiency. Not a single nationalized party could

Figure 8.9: Survival curves and model fit graphs for the effect of the share of left parties in the cantonal executive 2000–2018.



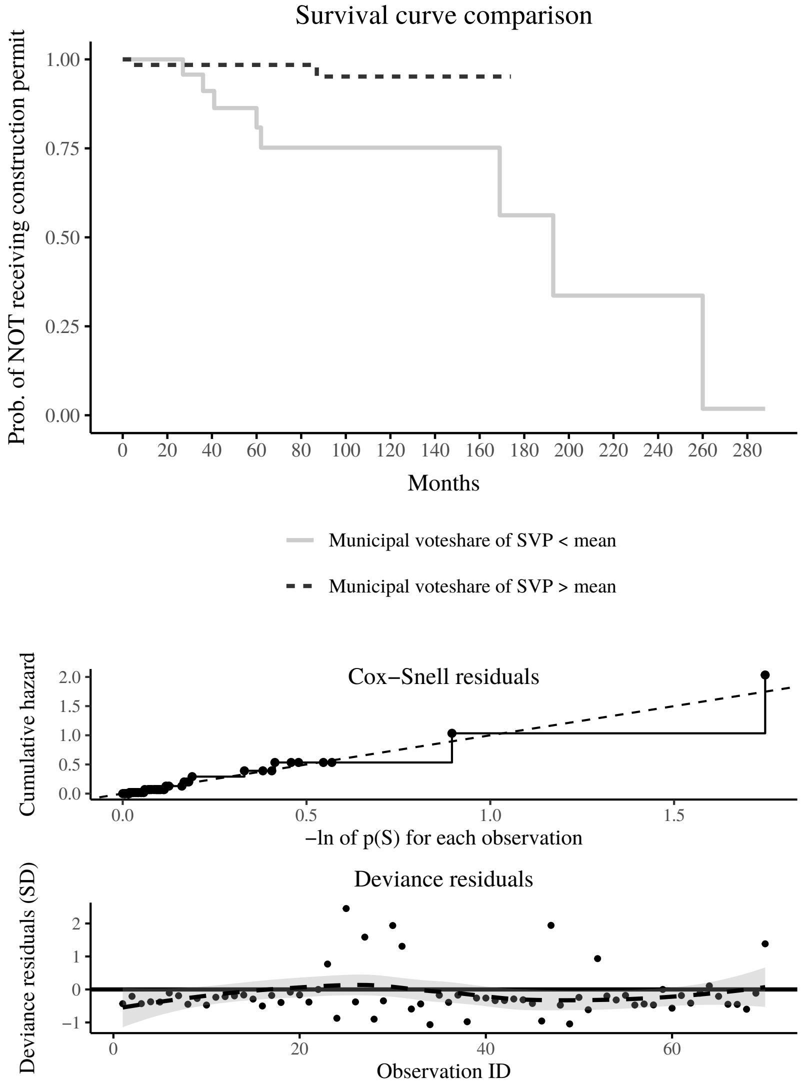
Notes: For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean. The model fulfills the proportional hazard assumptions test.

Table 8.10: Summaries of Cox-ph models. DV: efficiency; IV: partisan variables on the municipal level.

	Dependent variable:			
	Censored duration in months			
	(1)	(2)	(3)	(4)
Municipal vote share of SVP	−0.075** (0.034)			
Municipal vote share of FDP		0.022 (0.041)		
Municipal vote share of SP			−0.126** (0.084)	
Municipal vote share of GPS				0.033 (0.149)
French-speaking (munic.)	−1.310 (0.854)	−1.104 (0.952)	0.016 (1.012)	−0.941 (0.992)
Municipal population (2014)	−0.0001 (0.0001)	−0.0001 (0.0002)	−0.0001 (0.0002)	−0.00000 (0.0001)
Municipal population density (2014)	0.00002 (0.004)	−0.001 (0.004)	−0.0002 (0.005)	0.001 (0.005)
No. of people employed in agriculture (2013)	0.002 (0.003)	0.002 (0.003)	0.001 (0.004)	0.002 (0.003)
Municipal type (2012)	−0.014 (0.211)	−0.031 (0.252)	−0.207 (0.278)	0.682 (0.391)
Observations	70	68	72	67
R^2	0.138	0.053	0.080	0.105
Max. Possible R^2	0.606	0.567	0.549	0.570
LR Test (df = 6)	10.383	3.676	6.026	7.416
Score (Logrank) Test (df = 6)	10.669*	2.907	4.648	7.025

Notes: *p<0.1; **p<0.05; ***p<0.01. Standard errors reported in parentheses are cluster-corrected by cantons. PH-assumption can be maintained globally and individually for all shown models and their covariates. A model with the municipal GLP vote share does not converge, and a model with the CVP vote share does not pass the proportional hazard assumption.

Figure 8.10: Survival curves and model fit graphs for the effect of the share of the SVP vote share parties in the National Council elections 2015 on the municipal level.



Notes: For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean. The model fulfills the proportional hazard assumptions test.

be found whose vote share on the municipal level is conducive to greater efficiency in WE-project authorization procedures.

8.3.3. On stakeholder efficacy ratings

For the stakeholder efficacy ratings group, there were two series that were estimated: one on the municipal level and one on the cantonal level. As for the efficiency series, the basis of comparison are the projects (n = 85), not the cantons or the municipalities. I start by reporting cantonal-level effects.

Cantonal level

Table 8.11 shows all models for which a significant effect of cantonal-level partisan variables on the overall efficacy ratings by stakeholders could be found. Model (1) shows a negative effect of the cantonal vote share of the SP. Model (2) shows a positive effect of the cantonal vote share of the CVP. Model (3) shows a positive effect for the CVP as well, but this time it is the share of seats in cantonal parliaments. Overall efficacy as rated by stakeholders is higher if there is a higher share of CVP parliamentarians in cantons. Adjusted R^2s of the models are acceptable for 5-variable models, between 16.6% to 22.7%, but not outstanding.

In terms of magnitude, the overall efficacy factor scores show a decline of -0.016 SD for a 1% increase in cantonal vote share of the SP (17.9% of its SD). Put differently, for an increase of 1 SD (5.58%) in cantonal vote share of the SP, overall efficacy would drop by 9% of the overall efficacy SD. The effect is thus not very large. The effect for the vote share of the CVP is even a bit larger. For a SD increase in cantonal vote share of the CVP (14%) there would be an expected increase of overall efficacy by 0.21 SD. The CVP effect magnitude as a seat share in cantonal parliaments is in the middle of the two: For an increase in the seat share of the CVP of 1 SD (17.6%), an associated increase of the overall efficacy would amount to 0.16 SD.

Table 8.12 shows effects of these three significant variables on the five stakeholder efficacy dimensions and the factorized summary version of them, the overall efficacy factor scores. For the cantonal vote share of the SP, the effect is negative for all dimensions, but it is not significant for all. A higher cantonal SP vote share has a significant negative effect on the overall efficacy score and the dimensions of fairness and transparency but not on competence, perceived efficiency and satisfaction. The cantonal vote share of the CVP, in turn, is positively associated with all dimensions, but only three of them are significant at $p < 0.05$, namely the overall efficacy factor scores, transparency and perceived efficiency. For the share of seats in cantonal parliaments by the CVP, effects on all components and the overall scores are significant except for competence. The effect is also positive in all models.

What stands out is that competence is not a dependent variable that any of these independent variables may help explain. The competence of how an authorization procedure is managed is thus not influenced by cantonal parties or vote shares. The transparency DV, in turn, is significantly explained by all three. Satisfaction is only associated significantly with the CVP share in cantonal parliaments. For the CVP, the fairness and satisfaction-findings are not very robust across alternative measures, whereas transparency and perceived efficiency, however, are.

I shall also present the relevant survival curves. Because I depicted an effect of left parties already (see efficiency section 8.3.2.), I will show the smaller but positive effect of the CVP seat share in cantonal parliaments here. The other graphs are available on request. Figure 8.11 pictures its effect on all those four components and the overall factor scores for which the relation is significant minimally at $p < 0.05$. To recap: The dots show the bivariate distribution of the means by project. The slope is very similar (between 0.009–0.1) for each component. For a 1-SD change in the CVP seat share in cantonal parliaments, there is an associated increase of 15.8%–17.6% of a SD in the efficacy components.

In summary, I have detected a negative effect of a greater cantonal vote share (in the National Council elections 2015) of the SP with overall efficacy, fairness and transparency. For the CVP, the positive relation is a bit more robust: With a higher cantonal vote share and higher seat share in the cantonal parliament there is an increase in overall efficacy as rated by stakeholders. The two measures are especially robust regarding the positive effects of transparency and perceived efficiency.

Municipal level

For the municipal-level series, there is only a single significant partisan result that can be reported: The municipal vote share of the CVP is associated positively with overall efficacy as rated by stakeholders. This can be seen in table 8.13. Checking for other parties that are either in the center (GLP) or

Table 8.11: Summaries of multiple linear regression models. DV: overall efficacy factor scores; IV: partisan variables on the cantonal level.

	Dependent variable:		
	Overall efficacy (fs)		
	(1)	(2)	(3)
Cantonal vote share of SP	−0.016**		
	(0.006)		
Cantonal vote share of CVP		0.015**	
		(0.006)	
Share of seats in ct. parliament: CVP			0.009**
			(0.004)
French-speaking (ct.)	−0.182	−0.109	−0.095
	(0.145)	(0.124)	(0.139)
Cantonal population (2017)	−0.0001	0.0003	0.0002
	(0.0002)	(0.0002)	(0.0003)
Cantonal population density (per km^2)	0.0003	0.001*	0.001
	(0.0005)	(0.0004)	(0.0004)
Cantonal agricultural area in km^2	−0.006	−0.009	−0.008
	(0.009)	(0.009)	(0.009)
Constant	0.693**	0.020	0.048
	(0.283)	(0.317)	(0.272)
Observations	32	30	33
R^2	0.301	0.360	0.323
Adjusted R^2	0.166	0.227	0.198
Residual Std. Error	0.304 (df = 26)	0.294 (df = 24)	0.297 (df = 27)
F Statistic	2.234* (df = 5; 26)	2.704** (df = 5; 24)	2.578** (df = 5; 27)

Notes: *p<0.1; **p<0.05; ***p<0.01. Standard errors reported in parentheses are cluster-corrected by cantons.

Table 8.12: Excerpts of models by main IV of interest and across multiple DVs of stakeholder efficacy ratings.

	Dependent variables					
	Overall efficacy factor scores	**Fairness**	**Transparency**	**Competence**	**Perceived efficiency**	**Satisfaction**
Cantonal vote share of SP	-0.016** (0.006)	-0.019** (0.006)	-0.018*** (0.004)	-0.008 (0.008)	-0.012* (0.006)	-0.015* (0.007)
Cantonal vote share of CVP	0.015** (0.006)	0.012* (0.007)	0.015*** (0.005)	0.014* (0.007)	0.018*** (0.003)	0.013* (0.007)
Share of seats in ct. parliament: CVP	0.009** (0.004)	0.009** (0.004)	0.010** (0.004)	0.007 (0.004)	0.010*** (0.003)	0.010** (0.004)

Notes: *p<0.1; **p<0.05; ***p<0.01. Each IV/DV combination stems from a different model. Controls for each model include the variables of French-speaking (by canton), cantonal population size, cantonal population density (per km^2) and the cantonal agricultural area (in km^2). Standard errors reported in parentheses are cluster-corrected by cantons.

border on it on the right side (FDP) is sobering: As in models (2) and (3), there are no center or right effects of other parties that could replicate the CVP effect. Moreover, what is not shown is also insignificant: Models with left parties, such as the SP and the GPS, and with the other right party, the SVP, also show no effect. In terms of magnitude, the positive effect of the CVP is small: An increase of 1 SD of the municipal vote share of the CVP (16.4%) results in a positive increase of 0.1 SD in overall efficacy.

Regarding the other dimensions of stakeholder efficacy ratings, the municipal vote share of the CVP is a significant determinant of transparency and competence but not of fairness, perceived efficiency and satisfaction. For a 1-SD increase in municipal vote share of the CVP, the increase in efficacy dimension is between 8–10% — very similarly in size to the overall efficacy factor score. In comparison to the cantonal partisan models, where competence was unrelated to efficacy components, here with the municipal vote share of the CVP it is. Higher municipal vote share of the CVP is associated with a higher attributed competence in management of the authorization procedure, by 9.8%. Figure 8.12 shows the slopes and bivariate distribution of the overall efficacy score (top) and two of its significant components: transparency and competence.

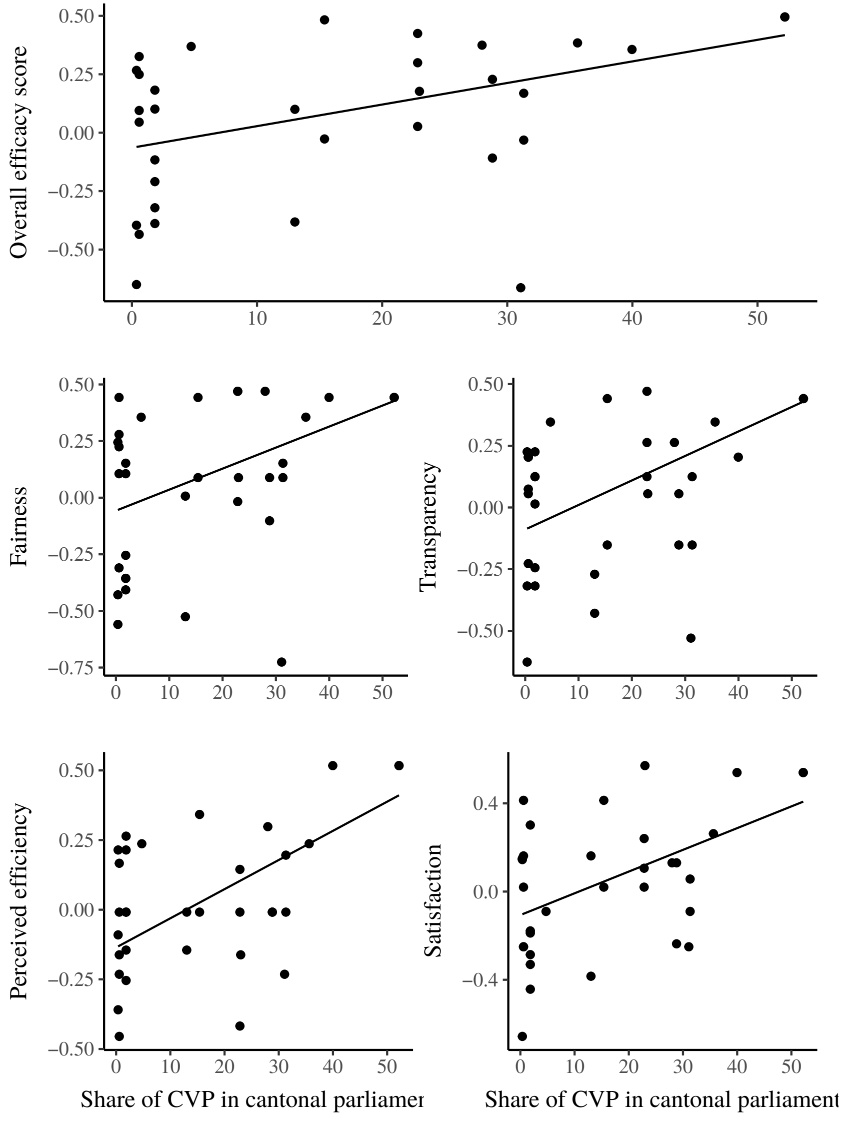
8.4. Policy rules effects

The series on policy rules has not been modeled following the same strategy as the decentralization and partisan effects of the third link. Rather, as developed in section 8.1. in the previous chapter, the series' estimation has been automated for the groups of efficiency and stakeholder efficacy ratings. For methodological details and reporting thresholds, the reader is referred to section 8.1. The aim of the series is to test whether sectoral and procedural policy rules that were applied in WE-projects have systematically affected the PSE of WE-authorizations. The basis of comparison in both the efficiency and stakeholder efficacy rating groups is the WE-project. I shall start with efficiency.

8.4.1. On efficiency

I distinguished between sectoral and procedural policy rules. Sectoral policy rules refer to more deeply embedded policy principles in the relevant policy

Figure 8.11: IV: CVP seat share in ct. parliaments, mean 2000–2018 and by project; DVs: all significant stakeholder efficacy rating dimensions.



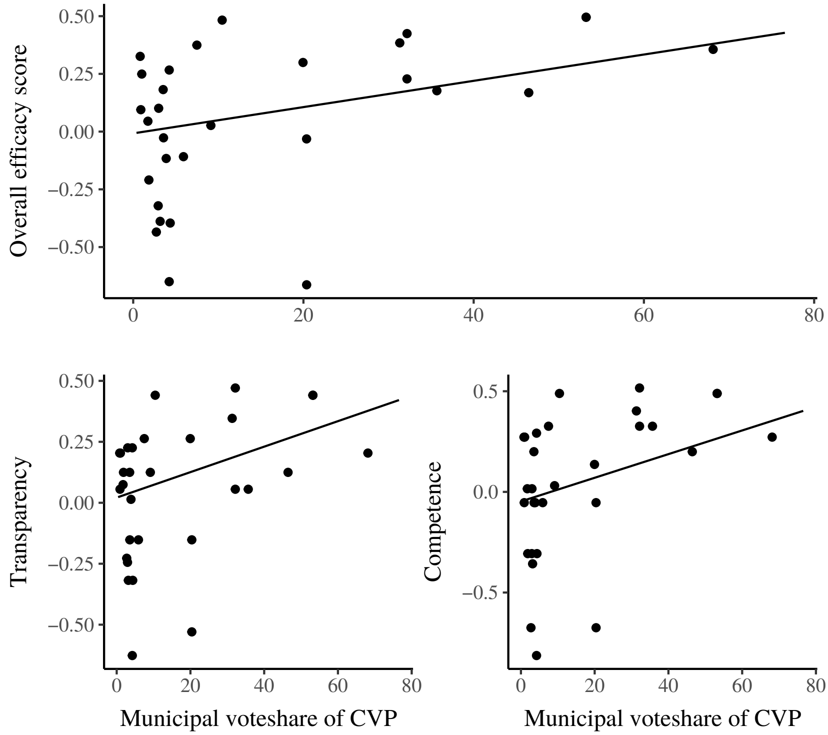
Notes: Dots indicate the bivariate distribution of observations. The regression line indicates slope depicting the estimated effect of the variable shown on the x-axis. Other independent variables held constant at their mean.

Table 8.13: Summaries of multiple linear regression models. DV: overall efficacy factor scores; IV: partisan variables on the municipal level.

	Dependent variable:		
	Overall efficacy (fs)		
	(1)	(2)	(3)
Municipal vote share of CVP	0.006** (0.003)		
Municipal vote share of GLP		0.018 (0.024)	
Municipal vote share of FDP			−0.002 (0.004)
French-speaking (munic.)	−0.158 (0.154)	−0.183 (0.197)	−0.291** (0.130)
Municipal population (2014)	−0.00002 (0.00002)	−0.00002 (0.00002)	−0.00001 (0.00002)
Municipal population density (2014)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
No. of people employed in agriculture (2013)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Municipal type (2012)	0.052** (0.021)	0.086* (0.042	0.077*** (0.018)
Constant	−0.460** (0.198)	−0.761 (0.600)	−0.425* (0.213)
Observations	30	25	30
R^2	0.395	0.322	0.344
Adjusted R^2	0.237	0.095	0.173
Residual Std. Error	0.292 (df = 23)	0.319 (df = 18)	0.304 (df = 23)
F Statistic	2.500* (df = 6; 23)	1.422 (df = 6; 18)	2.011 (df = 6; 23)

Notes: *p<0.1; **p<0.05; ***p<0.01. Standard errors reported in parentheses are cluster-corrected by cantons.

Figure 8.12: IV: CVP vote share in National Council elections 2015 by municipality and by project; DVs: all significant stakeholder efficacy rating dimensions.



Notes: Dots indicate the bivariate distribution of observations. The regression line indicates slope depicting the estimated effect of the variable shown on the x-axis. Other independent variables held constant at their mean.

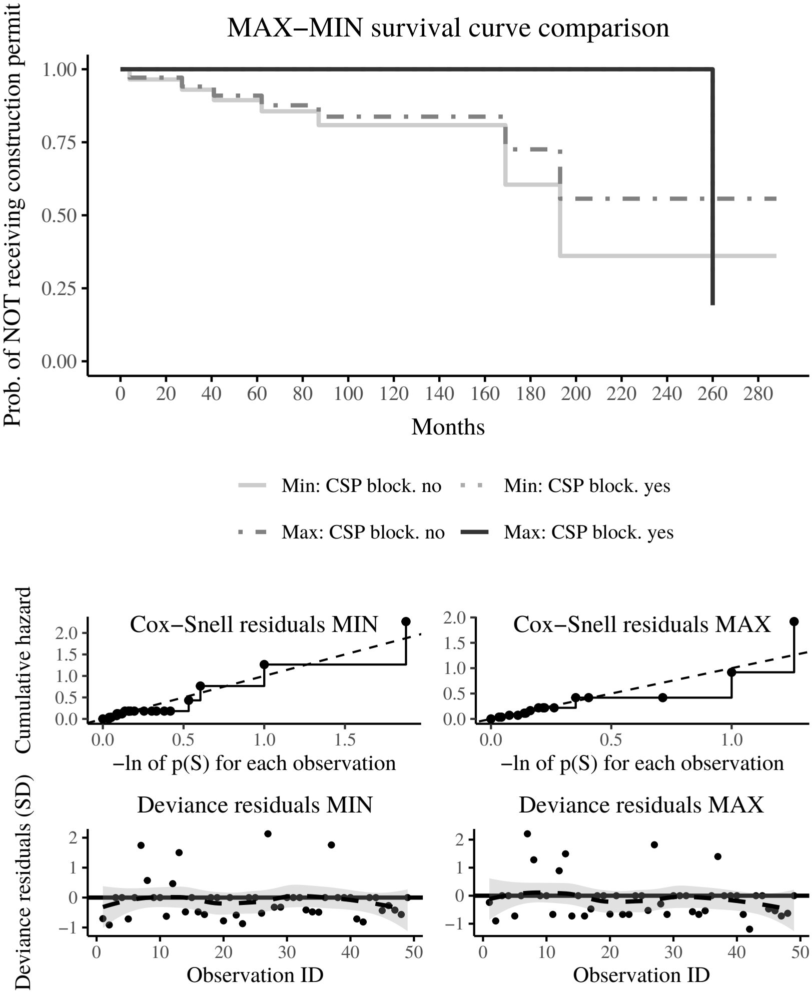
fields for WE-authorization procedures, i.e., spatial planning, construction and energy policy more broadly. They also contain municipal perceptions on how these principles are being dealt with. For example, a sectoral policy rule captures whether the executive or the parliament adopts the CSP. Procedural policy rules, in contrast, are tied to the concrete authorization procedure of a WE-project and refer to more easily changeable rules. They capture, for example, whether there was a concentrated authorization procedure for a project or not. For efficiency, no sectoral policy rules have passed reporting thresholds, but two procedural policy rules did, which shall be elaborated on in the following.

Blocking through CSP elaboration

Developers were asked to estimate whether they felt their project had been blocked by the cantons needing to establish a CSP and getting it federally validated. Their answer clearly shows to have an effect on efficiency. In figure 8.13 one can identify that those who have been blocked from continuing the development of the project have a survival curve that is associated with much lower efficiency than those where (developers felt) the cantons did not block through the duration of their planning. Whether one takes maximal or minimal effect size estimates does not make a large difference. Compared to the empty reference model (see figure 7.3) for both non-blocked survival curves, the descent between 160 and 200 months is not as strong here, but in the months 0–160 the decline in the probability of not receiving the construction permit is similar to the baseline. Hence, the non-blocking is not particularly conducive to greater efficiency, but the blocking clearly has a negative effect, delaying the curve's descent for minimal and maximal effect sizes to month 260. The minimal effect size for cases where there is blocking through the CSP (gray dotted line) is hidden underneath the black straight line. Based on the Cox-Snell and the deviance residuals, model fit is good.

For this series — like for the series of link 2 in chapter 7 — I transformed model results so I can report on category-external and -internal detractors. Detractors denote those variables that reduce the significance of the main variable under consideration in over 50% of models in which the main and the potential detractor variable are contained. Internal detractors refer to those detractor variables that are of the same analytical category (e.g. procedural policy rules) as the main variable. Correspondingly, external detractors denote

Figure 8.13: Survival curves and model fit graphs for the effect of perceived blocking through CSP elaboration.



Notes: For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean. The model fulfills the proportional hazard assumptions test.

these detractor variables that are of a different analytical category than the main variable. Details on how detractors were detected and are interpreted may be found in section 7.1.2..

For the developer perception of being blocked through the long elaboration and validation of the CSP, there is one category-internal detractor that consistently lowers it significance: the extent of private complaints ($\rho = 0.4, p > 0.1$). It is not directly correlated with project-blocking by CSP elaboration. Moreover, it did not pass the threshold to be reportable as an individual and direct explainer of efficiency itself. Hence, the extent of private complaints only manages to drive down the significance of project-blocking through CSP planning in combinations with other determinants. This suggests that issues that delay the elaboration of the CSP, in connection with other variables, are likely the same issues that lead to private complaints later.

Regarding detractors external to the category of procedural policy rules, there are two sectoral policy rules that can be reported. Neither of them correlates with the CSP-blocking variable, meaning that they only unfold their detractor power on the project-blocking indicator in combination with other (insignificant) determinants of efficiency. These two are not self-standing, significant and direct determinants of efficiency. They are the following: The first is the self-rating of affectedness of energy politics and policy to a municipality ($\rho = 0.06, p > 0.1$). The second is the self-rating of the affectedness of the municipality by the ES 2050 ($\rho = -0.1, p > 0.1$). Both detractors are relatively weak: They drive down significance only in a bit more than every second model — in a bit less than half of the main variable and the detractor being in the same model, the main variable remains significant.

Extent of associational complaints

The extent of associational complaints is *the* factor that is often being discussed in the proponent communities as the obvious culprit to inefficient authorization procedures. Far from being the only obstacle to deployment, the extent of associational complaints indeed shows a strong negative effect on efficiency. Compared to the empty reference model in figure 7.3, having a below-than-mean extent of associational complaints increases efficiency strongly. For this stratum, due to a lack of data and right censoring, the curves unfortunately stop at month 120. Approximately at month 60, there is a strong increase in the probability of receiving a construction permit for both the minimal and maximal estimation of effect size for the group of projects that has below-the-mean associational complaints. The empty reference model shows a curvature that is similar to the curves of the groups of projects with an over-the-mean extent of associational complaints, but only in the later months 160–260. Up until month 160, the curve shows a worse efficiency than said baseline.

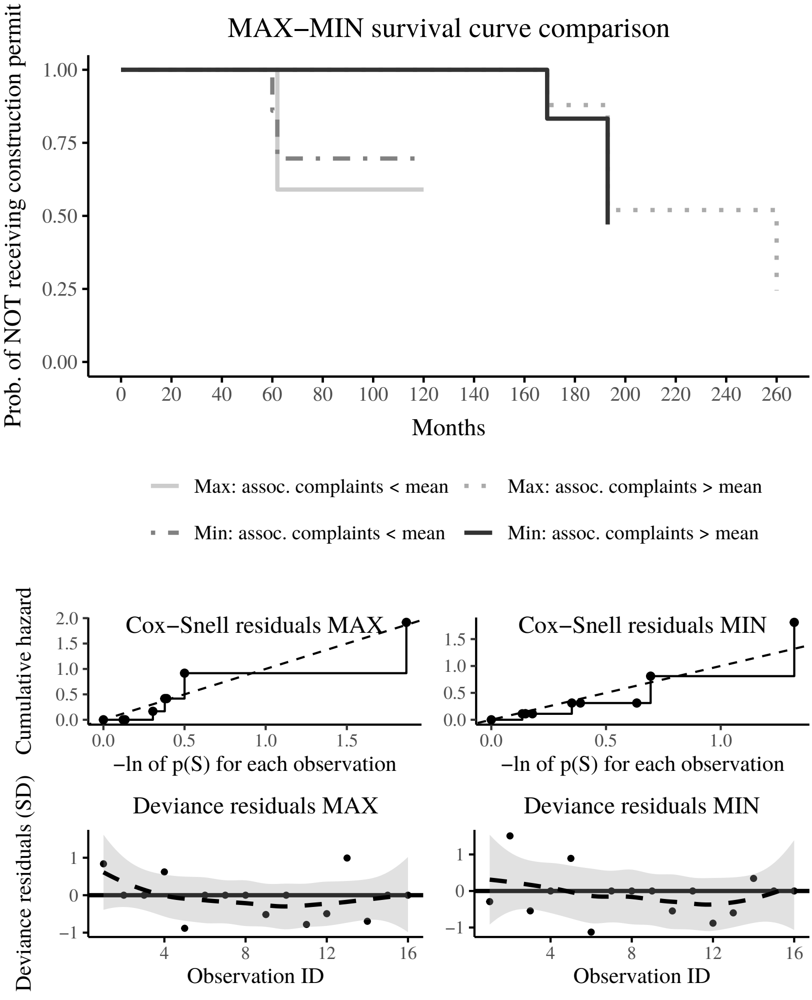
Regarding detractors that are category-internal to the procedural policy rules item of the extent of associational complaints, two can be reported: the number of conditional stipulations in the cantonal pre-project approval report ($\rho = 0.66, p < 0.01$) and the number of planning phases after CSP elaboration ($\rho = 0.12, p > 0.1$). None of them are self-standing explaining factors of authorization procedure efficiency themselves. The number of conditional stipulations in the cantonal pre-project approval report, however, is in positive correlation with the extent of associational complaints. Hence, it is likely that the extent of complaints is at least partially driven by the cantonal planners doing their job of formulating conditions for approval. This might be due to the complexity of the planned project: More conditional stipulations are formulated for projects that are conforming less well to the relevant legislation. It is these projects that seem to be especially targeted by associational complaints because they are likely more controversial due to their more disputed degree of legislation conformity. Additionally, in combination with other variables, the measure of how many planning phases a project had to pass or will yet have to pass detracts from the significance of the extent of associational complaints ($\rho = 0.12, p > 0.1$).

There are two category-external detractors to the significance of the extent of associational complaints: the sectoral policy rule of affectedness of construction policy and politics to municipalities ($\rho = 0.05, p > 0.1$) and whether the cantonal parliament or the cantonal executive passes the CSP ($\rho = 0.22, p > 0.1$). Both reveal their detraction power only in combination with other variables, not directly on the main variable. Moreover, both external detractors are individually insignificant determinants of efficiency.

8.4.2. On stakeholder efficacy ratings

In the stakeholder efficacy group of models, the policy rules series has also demonstrated two materially significant determinants. Again, both are from the category of procedural policy rules, not from the category of sectoral

Figure 8.14: Survival curves and model fit graphs for the effect of extent of associational complaints.



Notes: For reasons of graphic depictability, the survival curve shows the variable of interest as a dummy, with the cut-point at the arithmetic mean. The model fulfills the proportional hazard assumptions test.

policy rules. As opposed to the decentralization and partisan series, for the policy rules series, multicollinearity was not a problem, and the data did not need centering to correct for it. Therefore, only the overall efficacy scores are given in standardized z-scores, the others maintain their original scale (means by project).[262] Furthermore, what is special is that no sectoral policy rules act as detractors of main variable significance. Results of these two factors shall now be discussed in detail.

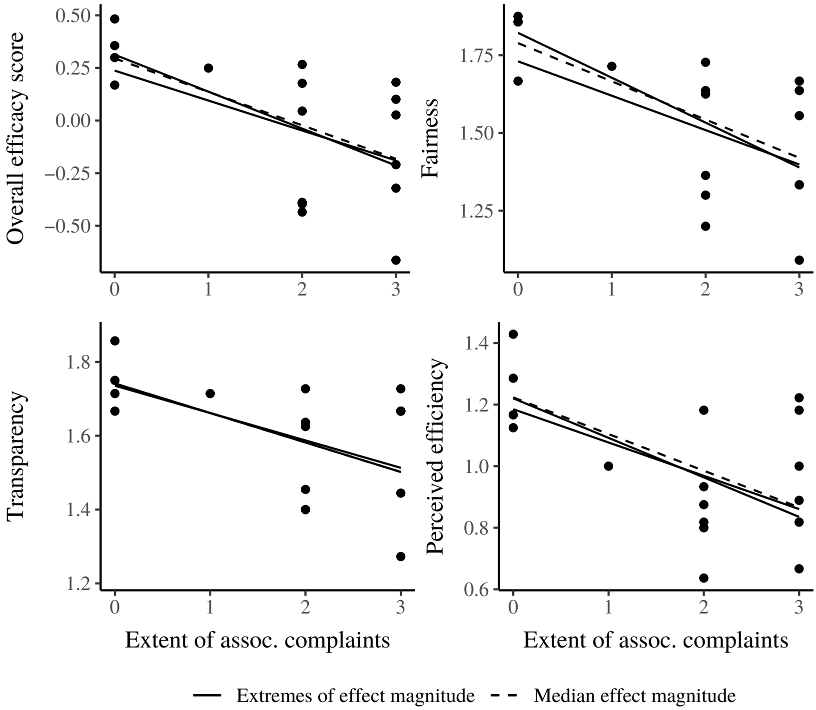
Extent of associational complaints

The extent of associational complaints has negative effects on three dimensions of stakeholder efficacy ratings and the overall efficacy factor scores. The index measuring the extent of associational complaints is coded categorically on a 4-point range of 0–3, an increase by 1 point means an increase of 87% of its SD. Such a one-point increase of the index lowers the overall efficacy score by -0.16 points or 16% of its SD. This slope and the one for the other three significant relations with stakeholder efficacy dimensions are visible in figure 8.15.

For fairness, transparency and perceived efficiency, the magnitude of the effect is more or less similar with -44.3% to -57.8% of the respective dimension's SD for a 1-point increase in the extent of associational complaints (remember that they are not standardized). For competence and for satisfaction, there are no significant relations: Stakeholders do not view each other as more or less competent if there is a higher or a lower extent of associational complaints. This is surprising given the highly contested nature of projects, but it shows that the competence of parties is not connected to the debate on associational complaints. Moreover, the component of satisfaction is also non-significant. This is to be expected, as all stakeholders, including plaintiffs, are included as stakeholders and presumably the satisfaction of opponents is higher for a higher extent of complaints if they succeed in combating what they view as a violation of law. Of course, this very much depends on the "type" of opposition, as fundamental and principal opponents aim at delaying and canceling projects altogether, whereas "moderate" opposition tend to be

262 For fairness, transparency, competence and perceived efficiency, the original scales are 0–2, with a "2" denoting the highest criterion fulfillment. The observed range of means by projects is 0.6–1.9. For overall satisfaction, the original scale is -2–2, with a "2" indicating highest satisfaction, "-2" the lowest and "0" meaning neutrality. The observed range of means by project is -0.6–0.75.

Figure 8.15: IV: extent of associational complaints (ordinal); DVs: all significant stakeholder efficacy rating dimensions.



Notes: Dots indicate the bivariate distribution of observations. The regression line indicates slope depicting the estimated effect of the variable shown on the x-axis.

content with more adequate project design. In short: Satisfaction denotes a different outcome for every involved stakeholder.

All detractors are internal, meaning from the same category of variables: Two procedural policy rules detractors directly reduce the significance of the extent of associational complaint if included in the models. Neither of them, however, is an individually significant determinant of efficacy dimensions or of the overall factor scores. These detractors are the number of conditional stipulations in the cantonal pre-project assessment report ($\rho = 0.66, p < 0.01$) and the number of conditional stipulations in the construction permit ($\rho = 0.74, p < 0.1$). Having more conditions attached to a project is thus partly equivalent to the extent of associational complaints. Whether or not conditions call for complaints or complaints introduce additional planning or construction conditions cannot be determined — both is likely to be the case.

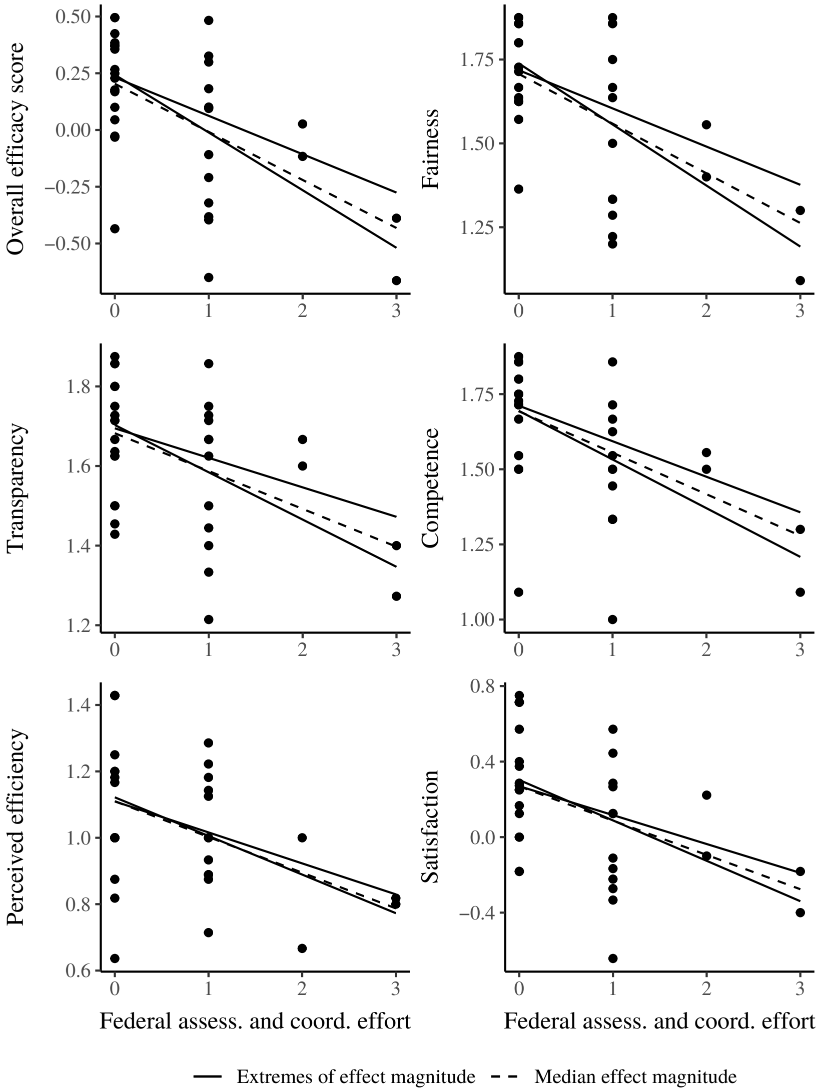
Additionally functioning as detractors to the extent of associational complaints, but only in combination with other variables, are the four following variables: the extent to which the municipality (authorities and inhabitants) profit from the project ($\rho = -0.09, p > 0.1$), the extent of stakeholder involvement as judged by municipal authorities ($\rho = 0.25, p > 0.1$), whether developers felt blocked by the (non)elaboration of the CSP ($\rho = 0.3, p > 0.1$), and the extent of the municipal assessment and coordination effort ($\rho = 0.11, p > 0.1$). None of the four are direct and significant determinants of stakeholder efficacy ratings. Hence, they not only detract from the extent of associational complaints through a combination of independent variables but also affect stakeholder efficacy only indirectly.

Federal assessment and coordination workload

For this variable I asked four federal agencies to rate which projects gave them "a lot to do" concerning assessment and coordination and which did not. The index converted qualitative data to an ordinal range of 0–3. The result is the following: Higher federal assessment and coordination workloads lead to lower stakeholder efficacy ratings in all its dimensions. The decrease in median slope of the overall efficacy score for a 1-point increase of the federal workload (+146.9% SD) is -0.21 points or 21% of its SD. This negative effect is smaller but comparable in size to the previously discussed effect of the extent of associational complaints on overall efficacy scores. For a 1-SD increase (less than 1 point) in federal workload, stakeholders rate efficacy dimensions at around 20% lower, depending on the dimension.

With respect to the detractors to this relation, there are again only category-internal ones to report. All three of them are significantly correlated with the federal assessment and coordination extent. This means that these detractors drive, or are driven by, the federal workload directly. They are the following three, none of which impact overall efficacy scores significantly themselves: The municipal assessment and coordination extent ($\rho = 0.41, p < 0.01$), the extent of associational complaints ($\rho = 0.51, p < 0.05$) and the number of conditional stipulations in the cantonal pre-project assessment report

Figure 8.16: IV: extent of federal assessment and coordination workload (ordinal); DVs: all significant stakeholder efficacy rating dimensions.



Notes: Dots indicate the bivariate distribution of observations. The regression line indicates slope depicting the estimated effect of the variable shown on the x-axis.

($\rho = 0.34$, $p < 0.1$) are likely drivers of (or resulting from) the extent of the federal assessment and coordination effort.

8.5. Comparing and interpreting effects

This chapter tests the third link in this study's analytical model, looking for direct and overall effects of decentralization, of political parties and of policy rules on PSE, without resorting to the "intermediary variable" of aspects of implementation arrangements. It discovered a variety of effects, which I will briefly summarize and interpret, starting with decentralization effects.

8.5.1. Decentralization effects

Table 8.14 provides a summary of the effects and their direction by component, direction and series (horizontal), versus the concepts of PSE (vertical). The table shows that effects of perceived local autonomy could be found across all three PSE measurements, with a consistently negative direction. The polity dimensions' component of perceived local autonomy has thus been found to decrease the probability of cantonal hosting, efficiency and ratings of stakeholder efficacy. This measure of decentralization can thus be said to stand in controlled negative association with PSE. However, the relation is not as highly robust when alternative measurements of polity decentralization by the LAI are used, meaning that effects of perception cannot be fully excluded. Still, it should be stated that the measure of perceived local autonomy could also be considered to be objective as it correlates strongly with Fiechter's (2010) arguably more objective measures of polity decentralization.

Perceived local autonomy is the only decentralization variable that can be found across all three concepts of PSE. Yet, to be fair, the three PSE measures do capture something different, so one PSE measure cannot be understood as serving as a robustness check for the other two. Rather, they represent different operationalizations of PSE bearing different meanings: Hosting probability models to which degree a municipality or a canton is likely to be a host of a WE-project. Efficiency refers to the duration of an authorization procedure. Stakeholder efficacy ratings measure how stakeholders assess the authorization procedure of a concrete WE-project using the criteria of fairness, transparency, competence of those actors leading the procedure, perceived efficiency and satisfaction with the procedure.

Table 8.14: Summary of decentralization effects on PSE concepts.

	(Dimension:) Component	Dir.	Level/Series
Hosting probability	Perceived local autonomy (2017)	↓	Municipal main IVs, cantonal controls
	Politics: electoral decentralization	↓	
	Politics: dd.* decentralization	↑	
Efficiency	Perceived local autonomy (2017)	↓	Municipal main IVs, cantonal controls
Stakeholder efficacy ratings	Perceived local autonomy (2017)	↓	Municipal main IVs, cantonal controls
	Policy: personnel decentralization	↑	

Notes: * "dd." stands for "directdemocratic". Mueller's (2015) dimension of polity decentralization is not shown as a separate indicator of hosting probabilities, because it is driven by its component, perceived local autonomy (2017).

With this in mind, Mueller's (2015) politics dimension components of electoral and direct-democratic decentralization are also significant for hosting probability. Electoral decentralization is negatively associated with it, whereas direct-democratic decentralization is positively associated with it. Electoral decentralization captures the extent to which a municipality has control over the setting and outcome of cantonal elections. Direct-democratic decentralization measures the "height" of the threshold of municipalities to overturn or initiate cantonal pieces of legislation. The more control they have over cantonal elections and thus the more they can bring themselves in, the smaller is the probability of hosting. This suggests that municipalities tend to have preferences against hosting. Moreover, the lower the threshold of contestation of cantonal legislation (and thus the higher the decentralization), the higher is the probability of cantonal hosting. Here, I suggest the following interpretation: Municipalities only take small (political) risks for themselves; cantons host only if their municipalities can challenge decisions with less effort. Hence, I suggest that lower legislation contestation thresholds further municipal experimentation and risk-taking and, thereby, agreement to hosting.

The other measure appearing significant for only a single concept of PSE is Mueller's (ibid.) policy dimension component of personnel decentralization. Higher relative municipal personnel resources are associated positively with greater overall efficacy as rated by stakeholders. The measure is also associated with three of the efficacy dimensions, namely with greater fairness, competence and perceived efficiency. Equipping the municipality with appropriate amounts of personnel resources thus has a positive effect — not for efficiency, for which municipal personnel resources do not make a systematic difference, but on how stakeholders assess the efficacy of the project.

Still, the most important finding is that perceived local autonomy affects the hosting probability, efficiency and stakeholder efficacy ratings negatively. What potential mechanisms could be behind this? Findings in links 1 and 2 (see chapters 6 and 7) have shown that greater municipal autonomy is associated with larger implementation arrangements and more veto players, which in turn are associated with higher intensity of conflict and mistrust. And conflict and mistrust in implementation arrangements, in turn, have been shown to have a negative effect on PSE.

Still, a word of caution is in order: For most indicators of the decentralization series in all three groups of models (by measure of dependent variable), no relation could be detected. Hence, it would be wrong to say that decentralization in general has been found to affect PSE. Rather, decentralization must be investigated at the level of the dimensions and components for which some significances could be found.

8.5.2. Partisan effects

A summary of partisan effects on PSE measures of political parties are shown in table 8.15. The table tells us the following: For hosting probabilities on the municipal level, only the vote share of the SVP could be detected as an explanatory factor, and no partisan effects could be found on the cantonal level. Regarding efficiency, the municipal vote share of the SVP was found to have a negative effect, and on the cantonal level the vote share of the SP, the SP's seat share in cantonal parliament and the left-party share in cantonal executives was discovered to have a negative effect. Equally on the cantonal level, the CVP's seat share in cantonal parliament and the size of the ideological spread in the cantonal executive showed positive effects on efficiency. Concerning the PSE measure of stakeholder efficacy ratings, a positive effect of the municipal vote share of the CVP could be detected. On the cantonal level, a positive effect of the vote share of the CVP and of the CVP's seat share in cantonal parliament and a negative effect of the vote share of the SP was found.

Let us interpret these findings: The SVP appears twice, but only on the municipal level. Its vote share is conducive to greater municipal hosting probabilities but detrimental to efficiency. The driver behind the positive effect of the SVP vote share on hosting are the farmers that disproportionately vote for the SVP, which tend to initiate or favor WE-projects on their lands in long term leasehold or as owners more so than the mean voter. The negative effect of the SVP on the municipal level on efficiency would be more in line with the "classical" expectation of right-wing WE-skepticism (e.g. Vuichard et al. 2019; Geisseler 2023). For this effect, farmers cannot be the drivers, as their number is insignificant in these models. The effect — and the absence of other parties' municipal-level effects — presents a picture of the SVP being highly critical of project development once hosting has been decided upon.[263] Hence, the SVP is the only party that systematically shows delay

263 The project start, and thus the start of hosting as measured in this project, is the point of time when potential developers receive the authorization for a met mast to measure wind speeds.

Table 8.15: Summary of partisan effects on PSE concepts.

	Indicator/dimension	**Dir.**	**Level/Series**
Hosting probability	Vote share SVP	↑	Municipal
Efficiency	Vote share SVP	↓	Municipal
	Vote share SP	↓	Cantonal
	SP seat share in ct. parliament 2000–2018	↓	Cantonal
	CVP seat share in ct. parliament 2000–2018	↑	Cantonal
	Left-party share in ct. executives 2000–2018	↓	Cantonal
	Ideological spread in ct. executive 2000–2018	↑	Cantonal
Stakeholder efficacy ratings	Vote share CVP	↑	Municipal
	Vote share SP	↓	Cantonal
	Vote share CVP	↑	Cantonal
	CVP seat share in ct. parliament 2000–2018	↑	Cantonal

effects on the level of municipality concerned with concrete project-planning and implementation.

In contrast, on the cantonal level, the focus is much more on policy development and much less on single and concrete projects. Here, the study detected a clear negative effect of the SP and a clear positive effect of the CVP. The SP's negative effect is unexpected, as the party programmatically tends to be in favor of the expansion of renewable energies (Lüth and Schaffer 2022). But the topic of WE-turbines has been shown to defy such expectations: Specifically, the absence of negative effects for hosting probabilities, the SP has not generally shown to be against WE-projects, but their negative effect on efficiency and stakeholder efficacy ratings can be explained in that the party has likely been driving an increase in requirements for project planning. While on a quest for greater sustainability of RE-infrastructure projects, this has made the procedure systematically less efficient and effective. These specific findings fit well with the findings from the literature on the "green-green dilemma" (Tafarte and Lehmann 2023; Dulluri and Raț 2019; Santangeli et al. 2016; Jackson 2011), which has found a trade-off between biodiversity and RE-infrastructure construction for left and/or green parties. In addition, the negative effect of the SP might also be driven by its advocacy for greater organizational participation in WE-authorization procedures associated with the left's stronger connections with environmentally-focused voters and organizations (Bühlmann and Gerber 2015; Markard et al. 2016). Greater size of implementation arrangements, in turn, have been found to be in association with lower efficiency and stakeholder efficacy ratings in link 2 (see section 7.6.).

A participation explanation does not square with the absence of negative GPS effects. The GPS is historically even more focused on the environment and understands itself as stemming from an environmental social movement (Seitz 2023; Ladner 2008); so the GPS should show negative effects across the board as well, but it does not. This is evidence that the GPS has more strongly been in favor of WE-projects than the SP, but not as strongly for a positive effect to be detectable statistically. It would underline that, even more strongly than the SP, the GPS has been entrenched in questions of WE due to said green-green dilemma. A way out of this dilemma is to focus on technologies like solar, where this perceived trade-off has arguably been present much less strongly, if at all, as photovoltaics has been highly accepted (Stadelmann-Steffen and Dermont 2021; Stadelmann-Steffen et al. 2018). Another "way out" of this dilemma would also be to strongly promote the reduction of use of electricity and its efficiency instead of focusing on building infrastructure.

As of today, there is no scientific evidence as to whether the GPS has indeed promoted energy efficiency as opposed to building RE-infrastructure more strongly.

The seat- and vote-share of the CVP is positively associated with efficiency and stakeholder efficacy ratings. This fits with the center party's self-image of being "pragmatic" and being the party that finds compromise. In view of the CVP's success in finding compromise on the federal level (Wirz and Vatter 2015; Brüschweiler and Vatter 2018), this finding does not come as a surprise. As another explanation one could also argue that the political center is simply not captured by a "green-green" dilemma, while at the same time it is not against renewable energies like right-wing parties on the cantonal and national levels (Vuichard et al. 2019; Stadelmann-Steffen and Dermont 2019). Such an explanation would fit to a story of the GLP, a center party that aims to merge green infrastructure development with liberal market policies (see Stadelmann-Steffen and Ingold 2023, 2015). But for this party there have been no detectable effects on PSE of WE-authorization procedures. At least for the case of WE, no effects are visible that would support that the party has systematically sought to "marry" infrastructure development with sustainability — and thus to overcome the green-green dilemma. The CVP has been, the data show, much more successful in this regard.

A finding worth noting is also the very strong positive effect of a greater ideological spread in the cantonal executives on efficiency. This is evidence that greater polarization in cantonal governments (Bochsler and Bousbah 2015) may be captured by the still predominant consociational decision-making in cantonal governments (Vatter 2020, 537) and even leads to an overall positive contribution on efficiency. This stands in contrast to the simple negative but overall null-finding of the effect of the ideological spread in cantonal governments on the intensity of agreement and trust in section 6.4.1..[264] This means that the positive effect of greater ideological spread on efficiency cannot stem from greater agreement and trust in the implementation arrangement but must work through a different mechanism. Rather, the working hypothesis is that greater ideological spread in cantonal governments is associated with lower number of involved organizations and veto players, because more

264 Note that the finding of ideological spread, regressed against implementation arrangement trust and agreement, showed a negative effect in linear regressions, no robust effect in mediation analyses and no effect in ERGMs. Thus, it was dropped as an explanatory variable of aspects of implementation arrangements. Here, the dependent variables are measures of PSE.

Table 8.16: Summary of policy rule series effects on PSE concepts.

	Indicator/dimension	Direction
Efficiency	Extent of associational complaints	↓
	Blocking through CSP elaboration and validation	↓
Stakeholder efficacy ratings	Extent of associational complaints	↓
	Federal assessment and coordination workload	↓

polarized views in cantonal governments allow for the sorting of conflicts early in the authorization procedure and the implementation arrangement. It is likely that there is indeed greater conflict in cantonal executives with greater ideological spread, but conflict is simply contained within the body itself, without spreading to the implementation arrangement.

8.5.3. Policy rules effects

The policy rules series tested whether policy rules show to have effects on efficiency and stakeholder efficacy ratings. Table 8.16 summarizes these findings. The determinant of extent of associational complaints has a negative effect on both efficiency and stakeholder efficacy ratings. Blocking through the elaboration of the CSP, as perceived by developers, has been found to have a negative effect on efficiency but not on overall stakeholder efficacy. For this finding I suggest that most stakeholders join an implementation arrangement after the CSP stage and that therefore the more negative ratings of developers on efficacy that would be expected are simply not strong enough for the overall implementation arrangement to show it accordingly.

In turn, the extent of the federal assessment and coordination workload has been found to have a negative impact on all dimensions of stakeholder efficacy. Yet it does not show an effect on efficiency. This is surprising as a higher assessment effort could be assumed to prolong the assessment effort, but empirically this factor does not stand out. There are likely too many other delay factors working in combination with each other that make the duration of additional time through federal assessment workload not long enough to come up as significant in statistical analyses.

Moreover, in agreement with the proponent debate of associational complaints being the sole culprits for efficiency, it can indeed be stated that there is a strong empirical basis for the argument, even across multiple concepts of PSE. But in contrast to this proponent topic focus, it is not the only determinant: Another highly significant delay factor is the duration of CSP elaboration and validation. Note that this is a cantonal planning effort, not a developer task.

Furthermore, one also needs to take a look at all items that did not turn out to be systematically related to either efficiency or stakeholder efficacy ratings. To give the reader an idea of which factors were tested, table E in the online appendix provides a list of all variables that entered the policy rules series models. In fact, it is astonishing that not many more factors turned out to be significant. I would like to select and comment on two of them because of their importance in the public debate: municipal assessment effort and the number of planning phases.

First, in the debate surrounding the question of whether municipalities should be relieved of their tasks because of duration concerns, municipal-level factors do not show up. Hence, based on this study, it would be empirically incorrect to say that municipal assessment effort is associated with greater duration. At the same time, greater local autonomy has been found to be negatively associated with efficiency. How does this go together? It is not the greater number of tasks that drives the negative effect of local autonomy, but it seems to be the additionally involved organizations and veto players in implementation arrangements as a result of greater municipal autonomy. Moreover, results also offer a reduction of the negative effect of perceived local autonomy on efficiency, at least for perceived efficiency as rated by stakeholders: Greater municipal resources relative to the canton have been shown to be positively associated with greater perceived efficiency and also with greater competence and fairness.

A second important finding is that the number of planning phases after the CSP — whether there is a single, concentrated phase that combines the LLUP- and the construction-permit procedures or not (see figure 5.2 in section 5.2.2.) — does not matter for PSE. Importantly, a concentrated procedure has not shown to be more efficient or more effective in stakeholder ratings. This supports the findings by Econcept (2015) that do not discover a positive effect in efficiency due to concentration of general construction authorization procedures. However, this non-finding can only be interpreted cautiously as the data does not rest on many cases, because there were not many concentrated procedures already — the non-effect can only be corroborated for Swiss WE-projects that have been operational at the end of 2021.

Chapter 9: The bigger picture — onshore wind energy authorization procedures and deployment in Europe 2000–2018

In international comparison, Switzerland is an extreme case regarding the strength of its municipal autonomy (Ladner and Keuffer 2021; Ladner et al. 2015), and the study has so far shown a negative effect of greater perceived local autonomy on efficiency and effectiveness of Swiss WE-authorization procedures. But how does the situation present itself in Europe? This chapter investigates authorization procedures and the expansion (*syn.* deployment) of onshore WE-turbines in Europe in detail. To the author's knowledge, the present exploratory study is the first *comparative* study that looks in-depth at effects of decentralization on onshore WE-authorization procedure policies for Europe.

In the European literature, the importance of authorization procedures for onshore wind turbine deployment has long been noted (Diógenes et al. 2020; Boie et al. 2015; Lüthi and Prässler 2011; Müller et al. 2011). Yet for the number of times it has been mentioned, there is surprisingly little scientific knowledge on the topic. The scant existing knowledge is based predominantly on practical reports on the topic (Noothout et al. 2016; ECORYS Nederland BV 2010; Ceña et al. 2010), and it stems from some very rare small-n country qualitative comparisons (Lauf et al. 2020; Pettersson et al. 2010; Liljenfeldt 2015; Toke et al. 2008). None of these studies investigate the role of decentralization, even though procedures are crucially affected by these factors of institutional embedment. Neither have studies so far examined implementation factors. In fact, political scientists have first and foremost been concerned with studying the impact of promotion policies (Can Şener et al. 2018; Papież et al. 2018; Aguirre and Ibikunle 2014; Nicolini and Tavoni 2017; Abdmouleh et al. 2015; Yi and Feiock 2014; Dong 2012; Jenner et al. 2013), and examining social acceptance and factors that are associated with it (Leiren et al. 2020; Enevoldsen and Sovacool 2016; Sovacool and Lakshmi Ratan 2012; Vuichard et al. 2019, 2021; Stadelmann-Steffen and Dermont 2021; Walter 2014; Batel et al. 2013; Stigka et al. 2014; Ebers 2017; Dütschke et al. 2017; Sequeira and Santos 2018).

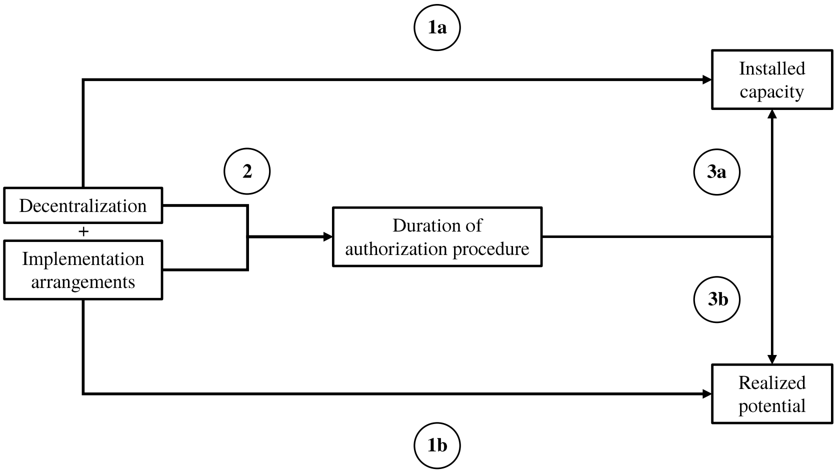
Within the literature on deployment policies, authorization procedures are rarely investigated, even though they would present an important lever for efficiency and effectiveness. Rather, this literature often focuses on (national-level) financial support schemes like feed-in-tariffs, designed to attract investors. With regard to the literature on social acceptance, I have argued that acceptance is only one part of permitting — surely a decisive one for the fate of a WE-project, but there are many more drivers and obstacles of deployment that are inherently political and should be investigated by political scientists. For example, implementation factors of administrative workings have so far been neglected as factors of deployment. This study presents a first step to incorporate and analyze such implementation factors. Moreover, the literature on energy federalism (Balthasar et al. 2020; Osofsky and Wiseman 2013), which pertains to using institutional factors as explananda for RE-deployment success, is still in its infancy (see, e.g., Wurster and Hagemann 2019). This study explicitly tests effects of decentralization in this regard. In short, to the author's knowledge this is the first study that investigates in-depth effects of decentralization and of implementation factors on onshore WE-authorization procedures and deployment in a comparative European setting.

To go about this task, the study relies on original expert survey/interview data for actor constellations and modes of interaction of bureaucratic actors, collected by the author between June and December 2020. 22 experts from 20 European countries shared their insights. The study additionally draws on much secondary data, especially to measure deployment (IEA 2019a,b; IRENA 2020), for the decentralization index of self-rule (Hooghe et al. 2016) and to extract the relevant policies of RE-support (IEA 2021). The available data, the many variables per case and the many "firsts" in terms of substantive focus of this chapter, require that the results must be understood as exploratory.

Figure 9.1 presents this chapter's analytical model. Decentralization, the main independent variable, is seen to have a direct effect on installed capacity (deployment variable 1) and on realized potential (deployment variable 2). Furthermore, indirect decentralization effects are scrutinized by testing whether it shows effects on the duration (negative efficiency) of onshore WE-authorization procedures (*syn.* "permitting"). In turn, effects on the duration of authorization procedures are then used as explanatory factors for installed capacity and realized potential.

Diverse methodological approaches present the testing method of these five links shown on the figure. Frequentist panel and mixed-effects models for the overall links between decentralization and deployment (links 1a and 1b) were estimated. To discover effects of decentralization on efficiency

Figure 9.1: Analytical model of chapter 9 on Europe's onshore WE-authorization procedures.



Notes: Analytical categories indicated by rectangular boxes, material content in regular font, links of correlational association in bold font.

(link 2), the study resorted to employing Bayesian linear regressions and Bayesian mediation models. The same methods are applied to detect effects of efficiency on installed capacity (link 3a) and realized potential (link 3b).

In its structure, the chapter follows the numbering of these links, after it has been properly set up: First, a literature overview over the selected variables is presented in section 9.1. Thereafter, a methods and data section 9.2. explains how the study proceeded to obtain results. Section 9.3. then shows results of investigations into links 1a and 1b. Results of link 2 are discussed thereafter in section 9.4. Subsequently, evidence on links 3a and 3b is presented in section 9.5. Thereafter, in section 9.6., the case of Switzerland is placed in the European context. A final section (9.7.) then summarizes and interprets the findings and discusses limitations of this European-level exploratory study.

9.1. Evaluating decentralization effects on onshore wind-energy authorization procedures in Europe

This study seeks to make four contributions to the literature: First, it wants to add to the literature on RE-deployment factors (see, e.g., Bourcet 2020; Can Şener et al. 2018; Darmani et al. 2014 for recent literature reviews) by scrutinizing the deployment factor of WE-authorization procedures, which the literature has so far neglected. In past studies, the focus of the literature has tended to lay on the contribution of public policy support schemes to additional RE-deployment (e.g. Marques et al. 2019). As the analytical scheme suggested, this study incorporates authorization procedures by examining effects of decentralization and of implementation factors that are modeled to have an effect on the duration (efficiency) of the authorization procedure and on deployment variables.

The second contribution is that the study aims to add to the debate on whether decentralization can help to make things more effective and efficient or whether, in contrast, decentralization blocks implementation outcomes. This is the age-old and classical debate on the "laboratory" hypothesis originating with Brandeis (1932), according to which small-scale entities attempt to develop solutions to a problem in parallel, and then adopt and disseminate the best one. In contrast, the epitome of the blocking hypothesis has been Scharpf's "joint decision-trap" (1988), in which the many actors that need to collaborate and find solutions cannot agree, due to often higher requirements of agreement thresholds in decentralized and/or federal countries.

The third contribution to the literature is that the study seeks to put the comparison of implementation aspects across cases in the center of attention, as the literature has called for (e.g. Imperial 2021; Hupe 2014). The standard international comparative approach provides the needed systematicity to begin establishing comparative implementation knowledge. This study presents a first step in this direction. Moreover, it wants to address the lack of low-level focus of empirical variation of outcomes, which has been another persistent issue in the implementation literature (Hupe 2014). The present study wants to heed this call by the choice of the very concrete topic of authorization procedures and the comparison of implementation factors within them.

The fourth contribution may be read as helping to jump-start the currently underdeveloped literature that has been labeled as "energy federalism". Effects of decentralization on energy policy outcomes have so far rarely been analyzed empirically and in comparative settings (see, e.g., Balthasar et al. 2020; Schaffer and Bernauer 2014; Wurster and Hagemann 2019;

Stadelmann-Steffen et al. 2020). This study presents an effort to improve the scientific understanding of institutional effects on energy transitions.

Deployment measures: installed capacity and realized potential

In the following, the section shall dive into the three relevant concepts of deployment, decentralization and implementation. Explanations proceed in this order.

Deployment has been a classical way of testing a RE-policy's effectiveness. To measure deployment, data on the installed capacity in megawatts (MW) is usually resorted to.[265] Here, installed capacity is used to evaluate the speed and growth of WE-capacity, not to evaluate the difference between national targets inscribed in policies and the present state (e.g. Strunz et al. 2021). The second measure of deployment that is employed asks about how much of the realistic national energy potential of onshore wind (in gigawatts of installed capacity) has been harvested and transformed into actual electricity already. This measure is in percent. Both are based on measuring onshore wind energy capacity and how it fluctuated between 2000 and 2018, but they measure slightly different things: Installed capacity shows stock changes in RE-capacity, while realized potential represents the already built percentage of the energy potential that could realistically be built in each country. Data for this maximum energy harvesting potential stem from Ryberg et al. (2019), who have estimated country-level aggregates based on a scenario of land eligibility, turbine costs and design, incorporating likely future technological developments.[266] The two measures of deployment present different challenges for developers and states. Whereas the first indicates developer and state experience with permitting, the second measures the "shortness of breath" or, in other words, the persistence or "tenacity" of building onshore WE-turbines in a country. None of the countries are very far along this latter dependent variable: Belgium, the front runner, is at 10.4% in 2018, and the

265 "Installed capacity" designates the maximum production capacity of an electrical system. For example, if a wind turbine of 3 MW installed capacity runs for an hour at its maximum, it will have produced 3 MWh of energy (electricity).

266 Their study finds that, after excluding territories that cannot be used for energy infrastructure construction, 26% of European lands remain available (Ryberg et al. 2020). Their study puts forth relatively conservative estimates and takes a (realistic) middle ground position in the land eligibility and energy production literature (McKenna et al. 2020).

Slovak Republic in 2018, the lowest in the sample, is at 0.003%. This variable indicates that in Belgium the most economically viable spots for onshore wind turbine construction have likely already been taken, suggesting an increased role of the "benevolent"[267] investor and a different role of the public actors that must switch their support from "jump-start" to "continue to grow". Despite their differences, both dependent variables are highly correlated, with Spearman's rank indicating ρ=0.82 ($p < 0.001$).

Decentralization as an independent variable

As independent variables, two groups of variables are examined. One is decentralization, the other consists of implementation factors. In comparison to the detailed measurement of decentralization for the Swiss study in the previous chapters, this European study resorts to only two indicators: One is taken from the "standard" and widely accepted "regional authority index" by Hooghe et al. (2016). As developed in section 3.1.2., measuring decentralization in a comparative country set-up can be validly done using this index' dimension of self-rule. Self-rule captures the authority of the subnational level, i.e. its autonomous final decision power. The dimension of shared-rule aspects is excluded because of the study's interest in decentralization effects, not federalism effects.[268]

Self-rule is one of the two dimensions of said index (dataset and code book: Shair-Rosenfield et al. 2021). It contains the components of "institutional depth", "policy autonomy", "fiscal autonomy", "borrowing autonomy" and "representation". These labels indicate exactly what these components measure and contain. Higher ordinal scores denote greater regional authority relative to the central level.[269] The used self-rule country scores are weighted

267 "Benevolent" in the sense that the investor needs to invest into projects that are less profitable, as the "best spots" are likely taken in the beginning of a country's WE-development.

268 Moreover, the study ignores aspects of the sub-subnational level, for which it could be argued that sub-subnational co-decision at the subnational level could be self-rule from a national-level perspective. It does this simply for reasons of conceptual simplicity. For more details, see section 3.1.2.

269 In detail (with quotes taken from code book RAI-country, p. 4ff.): Institutional depth measures "the extent to which a regional government [subnational government, author's note] is autonomous rather than deconcentrated". Policy autonomy contains "the range of policies for which a regional government is responsible". Fiscal autonomy comprises "the extent to which a regional government can independently

by population, based on population counts in 2010 (see code book by Shair-Rosenfield et al. 2021, 2). Self-rule, in short, can be understood to measure institutional decentralization. The annual country scores of 2000–2018 of the data are used in the analyses.

Figure 9.2 shows the bivariate distributions of self-rule, averaged across 2000–2018 against both deployment variables. Both deployment variables (top panel: installed capacity, bottom panel: realized potential) have also been averaged across 2000–2018. The line shows the regression line, and the gray band depicts the 95%-confidence intervals. In both plots, one can see a positive slope. It is more pronounced in the installed capacity plot and a bit less so in the realized potential plot. But at the same time, there is much spread in the data, indicating that the RAI's self-rule dimension is unlikely to explain a lot of these variances. Still, for installed capacity, Spearman's rank is still relatively high with ρ=0.55 ($p < 0.001$).

In terms of the spread, some data points are curiously distributed. For example, it is astonishing that the French "départements" have greater self-rule than the Swiss cantons. This requires some clarifications: First, the index captures only self-rule, not total regional authority. If the latter were measured, the order would be inverted, because France shows a shared rule score of 0.01 (mean 2000–2018) and Switzerland 7.92 (mean 2000–2018).[270] The second explanation is that — as mentioned previously — the scores are weighted by population, and this leads to the inversion.[271] Hence, this makes the researcher question whether the graphed link between the RAI's self-rule and deployment is actually driven by population size.

But even if population size were correlated with decentralization, this should not be a problem, because it could be the case that population size is simply a proxy for self-rule. In the total country-scores dataset, Spearman's ρ is 0.64 ($p < 0.001$) for land area and self-rule, and 0.75 for self-rule and population size ($p < 0.001$). For the used European sample, self-rule is correlated with land area at 0.37 ($p < 0.05$) and with population size at 0.67

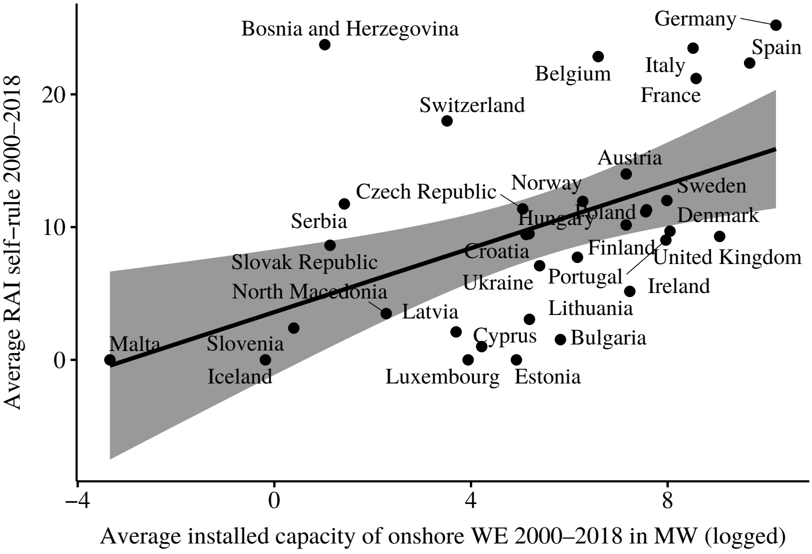
---

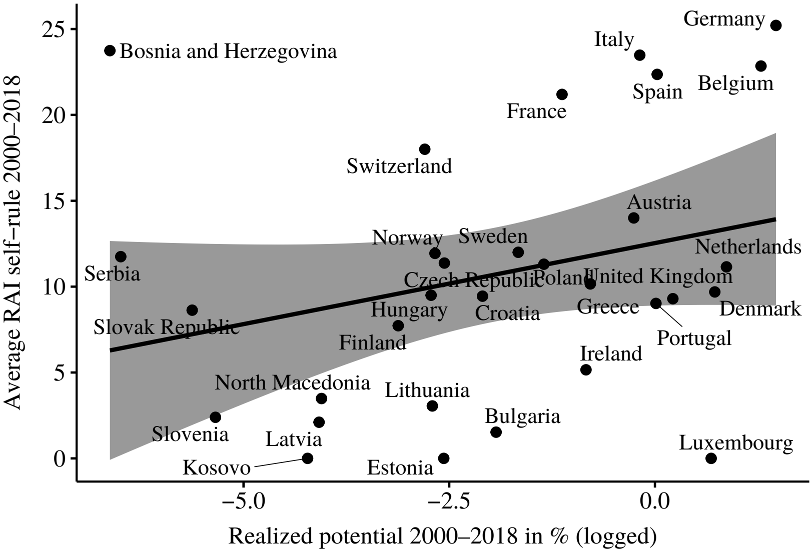
tax its population". Borrowing autonomy refers to "the extent to which a regional government can borrow". Finally, representation measures "the extent to which a region has an independent legislature and executive".

270 The self-rule and shared-rule dimensions correlate at ρ=0.65 ($p < 0.001$), the self-rule dimension correlates with the full RAI at ρ=0.99 ($p < 0.001$) and the shared-rule dimension correlates with the full RAI at ρ=0.72 ($p < 0.001$).

271 Looking at the disaggregated MLG-scores instead of the country scores of the RAI's self-rule, the French "départements" have a mean score of 9.9 (2000–2018). The Swiss cantons, in turn, over the same time span, have a score of 18.

Figure 9.2: Bivariate plots of self-rule (vertical axis) and both deployment variables (horizontal axes).





Notes: The gray band shows the 95%-confidence intervals.

($p < 0.001$). Hence, care will be needed to interpret findings of institutional decentralization, as the actual driver could be population size. However, alternative measures of decentralization also show a significant correlation with the country scores and population, pointing towards a more systemic issue of measuring decentralization across countries.[272]

The problematic measurement of decentralization — even though it is the widely used standard — is why it is crucial to investigate decentralization with an additional second measure: In addition to institutional decentralization, an item from the survey is used that asks experts about the extent of regional differences of onshore WE-authorization procedures in a country. This item refers to the distribution of tasks between levels of government in WE-authorization procedures. The measure is causally clearly much more proximate to explaining authorization procedures than institutional decentralization and could be understood as "policy decentralization". Still, it allows for a test of institutional decentralization because it can be viewed as capturing a specific, single policy field score of the self-rule component of the RAI's component of policy autonomy.

Implementation factors as independent variables

The second group of independent variables that are under scrutiny in this chapter are aspects of implementation arrangements that could potentially affect efficiency and deployment. These aspects have been identified by the analytical categories of the ACI by Mayntz and Scharpf (1995; Scharpf 1997). The theoretically interested reader is referred to chapter 2 for a detailed derivation and explanation of these analytical categories as applied to the present study: actor constellations, modes of interaction, policy rules and political parties. Actor constellations comprise the relative power positions of actors, as well as agreement and conflict. Modes of interaction, in contrast, capture the extensiveness of coordination. Policy rules and political parties serve as contextual determinants of efficiency and deployment. For the present purpose, these analytical categories shall be categorized into three (material) "classes": They measure either administrative (modes of interaction, actor

272 For example, the OECD's tax revenue indicators (2020), which are often used to measure (fiscal) decentralization, correlate with the RAI country scores at ρ=0.25 ($p < 0.1$) at the 10%-level, with self-rule country scores at ρ=0.34 ($p < 0.05$) and with its fiscal autonomy component country scores, its closest alternative component in the RAI, at 0.42 ($p = 0.01$).

constellations), advocacy/opposition (actor constellations, political parties) or authorization policy aspects (policy rules). Hence, the results-section of the present study will not refer to the ACI's categories but only to these material classes.

Compared to the approach of analysis on the Swiss case in the previous chapters, this European study is much more limited in that it only includes the following ten variable as descriptors of implementation arrangements, all based on data from the original European survey. They are the following: collaboration, administrative discretion, disagreement, agency blocking power, extent of civil society involvement, opposition strength, political involvement, number of opportunities for complaints, the extent of governmental planning prior to developers starting projects and a permit workload index. Section 9.2. discusses their measurement in detail.

Potential effects of decentralization?

Following this chapter's analytical model (see figure 9.1), these two groups of independent variables are expected to either have a direct effect on efficiency or a direct as well as indirect effect on either or both deployment measures. Which theories would expect an effect of decentralization on either efficiency or deployment? The study regards efficiency and deployment as resulting from the implementation process of deciding upon a construction permit.[273] In consequence, decentralization is seen to shape implementation arrangements, which, in turn, decide upon a construction permit, thereby contributing to deployment.

There are indeed many possible theories that would predict either a positive or a negative effect of decentralization on PSE. As effects on implementation arrangements, the literature has discussed the number of involved actors and veto players (e.g. Scharpf 1976; Feiock 2013; Tsebelis 2002; Vatter 2005), the reliance on negotiations (Scharpf 1993), the cooperation due to the "shadow of the future" (Scharpf 1997), the number of access points for organized interests (Baumgartner and Jones 1993), greater conflict in policy and arrangement (Lowi 1972; Braun 2000a) and a greater degree of

273 In many European countries, the construction permit does not equal the operation or grid access permits that are sometimes handed out separately. In this study, all three are conflated and the construction permit is simply referred to as the final authorization needed for operation in all countries.

agreement needed to make decisions (Scharpf 1997). In turn, the literature has expected the following effects of implementation arrangements on PSE: The intensity of conflict (Bryson et al. 2006; Provan and Kenis 2008), the intensity of collaboration including positive or negative coordination (Scharpf 1994, 1993), the number of involved veto players (Braun 2000a), the use of hierarchical direction (Scharpf 1997) and the legitimacy of the decision-making process (Klijn and Koppenjan 2016; Human and Provan 2000) have all been discussed as implementation aspects that impact PSE. Put together, this results in myriad possibilities of direct impact of decentralization on PSE. Important to retain is thus that — given the literature — there are plenty of possible positive, but also negative, effects stemming from the very same macro-phenomenon of decentralization. Chapter 4 presents these debates in detail.

9.2. Data and methods

As the title states, this section presents how this European comparative study proceeded and which data it analyzed how. The data are presented first, and the statistical methods applied will be discussed in a second step.

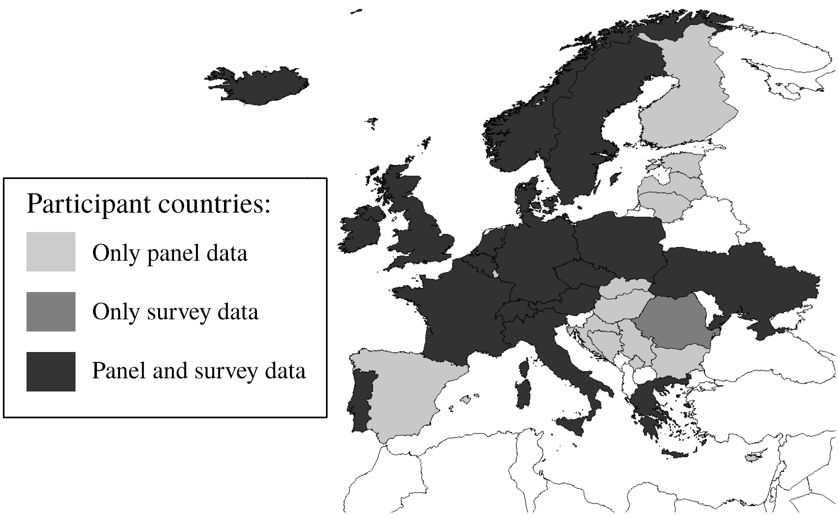
9.2.1. Data

The present chapter has relied on an original survey and a host of secondary data. They will be discussed in what follows and in said order.

The survey

The survey on the specifics of authorization procedures in European countries was held between June and December 2020 with 22 experts from 20 countries. Except for Belgium (Flanders and Wallonia) and the UK (England and Scotland), one expert answered per country. The survey included 30 questions and many additional sub-items on aspects of decentralization in authorization policy, administrative facets and advocacy/opposition issues. It took respondents about 1 hour to complete and could be answered as an online-survey, an excel-file or a "guided online-survey", which designates the mode of interviewing, in which the respondent and the researcher make a video call

Figure 9.3: Map of Europe showing countries that participated in the survey and for which panel data is available.



and fill in the online-survey. Recruitment for the survey happened through the use of snowballing by e-mail, with the help of contacts and contacts-of-contacts. Recruitment was very labor-intensive and difficult, not least because of differing national terminology regarding authorization procedure specifics. Respondent experts were either publicly employed, developers or NGO employees.

In the survey, most items were designed to be interpreted quantitatively with only few qualitatively oriented questions. Ordinal scales were assumed to have equidistance between all values, which is an assumption maintained for reasons of interpretative simplicity. Original item formulations are available upon request.

The survey data is used to answer links 2, 3a and 3b in this chapter's analytical model. For links 1a and 1b, in contrast, a panel fully based on secondary data was constructed. Figure 9.3 shows for which countries which data have been available for testing and estimation.

Secondary data

To measure installed capacity, data was taken from the International Energy Agency (IEA-org) databases of "Renewable Information Statistics" (2019a), from "World Energy Balance" (2019b) and from the International Renewable Energy Agency's (IRENA) "Renewable Capacity Statistics" (2020).[274] The realized potential variable was self-calculated based on installed capacity and data on the total realistic capacity by country from Ryberg et al. (2019). The deployment variable of realized potential is the percentage of installed capacity relative to the technically feasible installed capacity. Data on the duration of authorization procedures were extracted from the European Wind Energy Association's WE-barrier program based on its data from 2008 (Ceña et al. 2010).

As mentioned, the main independent variables are decentralization scores either from the RAI by Hooghe et al. (2016; dataset and codebook: Shair-Rosenfield et al. 2021) or from implementation arrangement aspects from the survey. The RAI's annual self-rule scores are either used directly or they are averaged between 2000–2018, depending on the investigated link.

There are two important control variables that must briefly be discussed: The first is an indicator of policy density, designed to capture the level of public support that the construction of onshore WE-turbines receives in a given country and year. To construct such an indicator, the author scraped the policies database of the IEA-org (2021) in December 2020 and January 2021 to get (national) subsidies and promotion data that the countries adopted between 2000 and 2018. Non-technology-specific policies of RE-support, from which WE-developers are assumed to profit as well, were also included.[275] The IEA-org contains the most advanced and complete policy dataset for RE in Europe/OECD. Without applying geographic restrictions, the initial scraping data contained 776 policies. In a first step, these data had to be re-

274 A few missings had to be retrieved from other sources for the countries of Sweden and the UK. For Sweden, the capacities in MW between 2000 and 2002 are based on panel 6.4 of the country's energy statistics factbook (Energimyndigheten 2019) in conjunction with an offshore development report (SWECO 2017, 23). For the UK, capacity data between 2000 and 2009 was calculated based on the Global Wind Energy Council's report's UK country profile (2011) together with an excerpt from thewindpower.net's countries statistics database (2021).

275 The data were scraped based on the sector tags "electricity" and "generation" and on the technology tags of "multiple renewable technologies", "multiple technologies" and then by "wind" and "wind onshore".

duced to match it to the available country data for European countries for the deployment variables. This reduced the scraping set of policies to 405 policies. In a second step, due to inconsistencies in labeling and categorization of measures by the IEA-org coding team, cleaning and correcting/evaluating the categorization of the policies required further desk research. At the end, only 323 policies were retained for analysis. The number of policies in force was then calculated per country-year and the result served as the "policy density" indicator used in the analysis, following the quantitative standard for accumulated number of policy measures ("ANPM"; see, e.g., Pitelis et al. 2020; Marques et al. 2019; Polzin et al. 2015; Aguirre and Ibikunle 2014; Marques and Fuinhas 2011). Because policies take time to show effects, the country's annual scores were shifted to three years later so that there is congruence in effect instead of congruence between years of entry into force and deployment DV.

The second important control variable are annual rates of PPP-adjusted GDP per capita in international USD from the World Bank's "Development Indicators" database (2020). In quantitative studies, GDP p.c. tends to be used as a "catch-all" control, without actually detailing what it means. The meaning of GDP, of what it controls for, thus needs to be clarified: In the present study, GDP p.c. is understood as a proxy of a country's income possibilities to develop RE-infrastructure. It is argued that GDP p.c. is superior to measuring investment volume because in many cases small-scale citizen's investments into community wind parks all over Europe (so-called "Bürgerwindparks" in Germany) are often not captured in official investment, which do not capture non-institutionalized investments. Moreover, in some countries there is no role of the institutional investor in RE-financing: In Switzerland, for example, investments into WE-planning are almost exclusively the domain of (partly) publicly-owned energy utility companies — and this, in turn, is not easily separable from other public investment flow data that could have been resorted to alternatively.

9.2.2. Methods

The methodological strategy differentiates between links 1a and 1b versus links 2, 3a and 3b. Links 1a and 1b are "overall" links, whereas links 2, 3a and 3b are "partial" ones. The overall links follow the frequentist paradigm, and the partial ones use the Bayesian paradigm of statistics. Both strategies are presented in the following.

Frequentist panel and mixed models

To estimate the overall links, an effort was made to select the methods that best fit the available data: As most of the data on deployment, decentralization and controls are available by year, standard panel (*syn.* econometric) models and mixed models (*syn.* multi-level models) as robustness checks were chosen. In terms of causal interpretation, these methods' inclusion of temporality certainly represent an advancement compared to the pure cross-sectional analyses that have been conducted so far.

How these models were estimated requires some explanations: I use the terms of "fixed" and "random effects", thus following Croissant and Millo (2008, 34), who maintain that "[...] having fixed effects in an econometric model has the meaning of allowing the intercept to vary with group, or time, or both, while the other parameters are still assumed to be homogeneous". In contrast, random effects refer to modeling an individual error term (not the idiosyncratic) by time and/or group (ibid., 34). The decision on which of these models are presented is based on the result of the Hausman test (1978). A battery of further tests then had to be conducted with either of these models: All estimated models showed cross-sectional heteroscedasticity based on the Breusch-Pagan test (1979). Moreover, following the Breusch-Godfrey test result (Breusch 1978; Godfrey 1978), it was discovered that all the estimated panel models were subject to serial correlation. To detect possible cross-sectional correlation, Breusch-Pagan's Lagrange multiplier test (1980) was applied. It found that all models suffer from cross-sectional correlation. Applying fixed effects cannot solve the problem completely, as they only cancel out effects of unobserved values having a time-invariant effect. In case of cross-sectional dependence, fixed-effects models still contain effects of, e.g., international political or economic shocks that vary in their strength of effect across the cross-section and may vary over time, but they can be corrected for (see, e.g., Henningsen and Henningsen 2019). For the random-effects models, it was further checked whether the pooling model or the random effects model performed better, again using Breusch-Pagan's (1980) Lagrange multiplier test. It indicated in all models that there is a clear panel effect, where random-effects models perform significantly better. For the fixed effects models, an f-test was further conducted to test whether the inclusion of "time fixed-effects" made sense — it did not, in none of the models.

The presence of heteroscedasticity, serial correlation and cross-sectional dependence calls for a strategy to correct the likely biased standard errors

(SE) by supplying adjusted covariance matrices. To go about this task, the models were estimated using two different SE-corrections. Driscoll and Kraay's (1998) correction has been the accepted standard for correcting both cross-sectional and serial correlation at the same time in the literature on RE-deployment (see, e.g., Marques et al. 2019; Carley et al. 2017). A second SE-correction method that controls for heteroscedasticity and serial correlation is the "HC" method as developed by Arellano and White (White 1980, 1984; Arellano 1987), yet this approach does not correct for cross-sectional dependence.[276]

Statistical significances of both selected standard-error correction approaches are shown because it is not desirable to entirely cancel out cross-sectional dependence in fixed effects models. On one hand, exogenous shocks that affect various cases in the cross-section differently and vary across time indicate bias in the regression coefficients to be estimated, as the covariance between the error terms of the cases is not zero, when time is held constant (see Sarafidis and Wansbeek 2012, 3). On the other hand, as fixed effects estimators do not use "between-variance" but only "within-variance" to estimate coefficients, the different receptivity to exogenous shocks in different cases and across time might be a welcome part of variability to be included while at the same time keeping time-invariant effects out. Hence, one should adjust interpretation of significant effects to the meaning of the approach of standard-errors correction.

For robustness, a battery of mixed models was estimated that allows to make an additional distinction in model specification — it permits the additional modeling of random slopes in addition to fixed effects in multi-level models. The estimation strategy for mixed models differs from the strategy for panel models, as longitudinal mixed models are not designed for robust standard-error corrections, given that the random component in mixed models allows for a "correction" of the level-1 individual error components already. While the random-effects model in the previously explained (single-level) panel data analysis is the same as a mixed model with the intercept being the only random regressor (Croissant and Millo 2008, 36), the panel-fixed effects model has no direct equivalent in the mixed-models literature (ibid., 35).

276 Additionally, Beck and Katz' (1995) panel-corrected standard errors were also employed to correct for heteroscedasticity across time and serial correlation across time. But since the panel cross-section is large relative to the time dimension, this correction has been shown to perform poorly (Hoechle 2007, 284); thus it has been dropped from the analysis altogether.

Hence, the term "fixed effects" in the mixed-models literature only refers to first-level parameters being assumed constant rather than random across the population (ibid., 34f.). Fixed effects in mixed models can thus be interpreted as population averages, just like in simpler pooling models. The random slopes variables in the estimated mixed models were selected according to which configuration of random slopes had the best AIC (Akaike 1974) and BIC (Schwarz 1978) scores, all other model specifications being equal. The independent variable of self-rule was selected to have a random slope for theoretical reasons for all models. To control for serial correlation, an error model with an autoregressive term of lag 1 was used (henceforth "AR1"; see Pinheiro et al. 2021).[277] Additionally, for each specification of random and fixed slopes a linear pooling model (not a linear mixed model) was estimated, in which the same autocorrelation specifications were included in addition to a heteroscedasticity correction that attributes weights to the error variances (see ibid.). The heteroscedasticity correction attributes different weights by country.[278] A linear mixed model that incorporates both the serial and the heteroscedasticity correction could not be estimated, as the models did not converge due to overspecification. What is more, the heteroscedasticity correction did not allow to fully get rid of all heteroscedasticity. The Levene test (see Fox and Weisberg 2019) indicated that a substantial part of heteroscedasticity remained. Actual estimation of both panel and mixed models was conducted in the statistical software *R* (R Core Team 2022), using various additional packages.[279]

Last, a note on the limited use of control variables in the panel and mixed models is in order: In all models, maximally two potential confounders are included between self-rule as an IV and both deployment variables as DVs. They are, on the one hand, the discussed WE-promotion policy density indicator with a negative lag of 3 (t+3) and, on the other hand, GDP per capita.

277 I supplied the specification that the autoregressor assume a different correlation structure for each country and gave the indication that the spacing between repeated observations of the same country is in years (discrete time). In *R* code: correlation=corAR1(0, form = Year|Country).

278 In *R* code: weights=varIdent(form = 1|Country).

279 For data handling, I used the *tidyverse* (Wickham et al. 2019). For model estimation of panel and mixed models, I used the packages *plm* (Croissant and Millo 2008), *lme4* (Bates et al. 2015) and *nlme* (Pinheiro et al. 2021). For standard error corrections, I relied upon the packages *lmtest* by (Zeileis and Hothorn 2002), *sandwich* (Zeileis et al. 2020) and *lmertest* by (Kuznetsova et al. 2017). The Levene test was taken from the *car* package (Fox and Weisberg 2019).

WE-related controls, such as wind speeds, harvesting possibilities etc., are not confounders, because they cannot theoretically influence self-rule and hence cannot confound the relation between self-rule and deployment. The possible confounders of population size and land area size are not included because they correlate with the self-rule country scores as discussed in section 9.1., and controlling for them would inflate variance (multicollinearity). Unobserved variable bias in fixed-effects models cannot be the case by definition, so the problem is reduced to potential bias in random-effects models. Potential cultural confounders, as was seen in the chapters on Switzerland, cannot be controlled for due to the lack of quantitative data on the subject. Overall, the study argues that the two included controls are sufficient: Policy density likely affects decentralization, especially over the long term, and these policies have been designed to promote installed capacity and realized potential, making it an unequivocal confounder. GDP, in contrast, is understood as a proxy measure for a country's possibilities to develop RE-infrastructure. But at the same time country income is very likely to shape decentralization, again, especially over the longer term. Hence, it can be regarded as a likely confounder as well and should be included in models as a control variable.

Bayesian approach

For the estimation of the partial links 2, 3a and 3b, the study pivoted to a different statistical paradigm, from frequentist to Bayesian. With Bayesian analyses, researchers intend to provide a posterior probability statement, i.e. not a precise estimate but a distribution of realistic values that an estimate is likely to take, taking into account previous knowledge on the distribution of a variable (Jackman 2009, xxvii). The previous knowledge on the variable is specified as a "prior distribution". This distribution is updated by being confronted with data and results in a posterior distribution (Bayesian updating). The choice of Bayesian statistics was made for two reasons: First, it is particularly useful when sample sizes are small (Zitzmann et al. 2021; Depaoli and van de Schoot 2017), in which case "thoughtfully" applied priors (see Smid et al. 2020) may add much needed additional information to models that the investigation of small amounts of data by itself could not supply (see McNeish 2016 for a critique). The present survey has only 22 respondents from 20 countries; thus, such an approach seems appropriate for these data. However, if there are not much data available with which to update the specified priors, prior specification becomes even more important and critically determines the posterior distribution.

The second reason why it makes sense to apply Bayesian statistics for the present survey is that the collected data cannot be strictly considered to be a sample from some larger population (see Jackman 2009, xxviii). In fact, the present survey is clearly a non-random sample of European states. It is non-random because recruitment of experts happened via snowballing. That the Bayesian approach relaxes the assumption of randomness in sampling is clearly beneficial to this survey, which cannot claim representativeness. But snowballing opens another problem: the assumption of independence of observations. However, this should not be overly problematic as it can be maintained that the collected responses are independent from each other, even though they are collected through contacts-of-contacts. Two experts might know each other because they have the same opinions. But all experts worked independently on projects *in different countries* with different authorization procedure designs. For example, answers of two developers that know each other in different countries are likely more independent from each other than answers from two developers in the same country that do not know each other. Hence, independence of observation is not considered to be a problem.

The selection and specifications of priors need some more explanation: Prior specification in case of small amounts of data, with which the prior is updated to generate the posterior distribution, generates the often-heard reproach of subjectivity (ibid., xxviii). It is therefore especially important to be transparent about prior specification and resort to only a weakly informative one. As is often the case, the problem is that it is rare for researchers to be able to specify the priors based on previous studies. Hence, as the literature recommends for cases where you cannot rely on distributional knowledge from previous studies, the Bayesian regressions conducted in this chapter use weakly informative prior on the β's and on σ's to be estimated (Lemoine 2019; Depaoli and van de Schoot 2017). In all analyses, normal priors on the β's with mean zero and σ^2 of 2.5 were used. Exponential priors (hence weakly informative) with prior autoscale adjustments were used for the idiosyncratic error σ's (see Gabry and Goodrich 2020). Why were normal priors resorted to? First, because it makes sense to expect a central limit tendency in the categorical data of the survey that heavily relied on Likert-scales and in most cases included a "no-effect" (zero) as the middle category. Second, for the lack of a better indication in the literature: There is no a priori reason to expect heavy skew or kurtosis in the survey β's or the σ's, which would have led me to consider alternative priors. Nevertheless, readers should keep in mind the selected priors in all models and the possible bias that this might induce.

To check whether the data fit a normal distribution that the priors assume, this assumption was tested: For self-rule, all country-scores are not significantly different from a normal distribution using the Shapiro-Wilks test (1965) if they are log-transformed. Checking further which distribution would correspond most closely, an algorithm found it to be fitting an exponential t-distribution most closely.[280] This is indeed very closely related to a simple normal distribution, except that it has "fatter" tails. Hence, for reasons of simplicity and calculability, a normal distribution may be assumed, thereby ignoring the slightly fatter tails that are empirically present. For the data of administrative lead times as calculated by Ceña et al. (2010), in their logged form their distribution is not significantly different from a normal distribution. Hence, these two main variables will be included in the subsequent calculations in logged form. For the data stemming from the survey (factor scores and indicators directly taken from the expert survey results) validating the assumption of normal distribution is unfortunately not possible: The reason is that there is simply not enough data to validly justify a distribution test based on these 22 data points per item. Thus, in the case of survey data, the assumption must remain one. Therefore, in addition to z-standardizing all survey data, no additional transformations were conducted. In some cases this has led to an unfortunate double-transformation of coefficients (log and z).

Extracted factors as independent variables

To elicit latent factors used for the Bayesian linear regressions and mediation analyses, to reduce the high number of variables and to partly control for multicollinearity among predictors, frequentist exploratory factor analyses (EFAs) were first conducted. Before running the EFA-routines, variables were first grouped by theoretically expected alignment into the three mentioned variable classes of administration, advocacy/opposition and policy rules. This procedure resulted in the estimation of four models, two on administration, two on advocacy/opposition. Models for policy rule indicators were estimated as well, but they were discarded because their factor loadings could not be interpreted; thus, the raw data was used to construct an index instead.

280 See the *gamlss* (2018) package in *R* for this fitting procedure.

Table 9.1: Implementation arrangement aspects investigated in this European chapter.

Indicator	**Class**	**Analytical category**	**Pre-paration**
• Collaboration	Administration	MOI*	FS*****
• Administrative discretion	Administration	AC**	FS
• Conflict	Administration	AC	FS
• Agency blocking power	Administration	AC	FS
• Civil society involvement	Advocacy/opposition	AC	FS
• Opposition strength	Advocacy/opposition	AC	FS
• Political involvement	Advocacy/opposition	CA***	FS
• Opposition (complaints) opportunities	Advocacy/opposition	PPR****	FS
• Pre-project governmental planning extent	Authorization policy	PPR	Raw data
• Permit workload index	Authorization policy	PPR	Index

Notes: * “MOI” stands for “modes of interaction”. ** “AC” is short for “actor constellation”. *** “CA” is an abbreviation of “contextual actor”. **** “PPR” means “procedural policy rule”. ***** “FS” is short for “factor score”.

Factor loadings were estimated and extracted in the following way: Because the number of survey observations per factor was low, a "regularized exploratory factor analysis" (Jung and Lee 2011; Jung and Takane 2008), which has been specifically developed for use in small samples, has been employed whenever possible. Their method optimizes parameter estimates by shrinking initially obtained estimates of unique variances with a single regularization parameter (Jung and Lee 2011, 703). Because their method does not permit the extraction of a single factor, another algorithm had to be used where unfortunately such a regularization technique does not exist. But for this specific model, with a power of 14 observations to 1 factor, this should not be overly problematic. All EFA-model results are available upon request. All models used the "Oblimin" rotation technique, except for the 1-factor model, where unrotated factor loadings are given (single factors cannot be rotated). This oblique extraction method has the advantage that the unrealistic assumption of orthogonality of factors that "Varimax" or other orthogonal extraction methods maintain can be relaxed. Moreover, with an oblique rotation method, factors are allowed to correlate with each other (see, e.g., Worthington and Whittaker 2006), which is much more realistic. The factor scores used later on in the Bayesian regressions were extracted using the Thurstone method (1934). All models contain no Heywood boundary cases (1931), and their factor determinacy, following the Guttman criterion (1955), is sufficiently high to be considered for further analysis (see Grice 2001).[281] Again all factor analysis operations were conducted in *R* with dedicated packages.[282]

Table 9.1 shows the resulting indicators, their "classes" meaning their material categorization, their analytical category and how the raw data has been prepared to be used in Bayesian regressions and mediation models later on. As discussed previously (see section 9.1.), the indicators have some theoretic footing in the ACI, as the previous chapters on Switzerland did. Most implementation arrangement aspects are characteristics of actor constellations: They represent relative power and conflict positions as well as relative discretion. The selection of modes of interaction variables is very limited here

281 Following Grice (2001, 436), Gorsuch (1983, 260) recommends 0.80 as a minimally acceptable indeterminacy factor threshold but advocates for a score of > 0.9 if factor scores are estimated and used later on. All factor determinacy scores in the models are reasonably high and can be accepted for further calculations.

282 The *fungible* package (Waller 2020) contains the restricted exploratory factor analysis function, and the *EFAtools* package (Steiner and Grieder 2020) was used to estimate the unrestricted EFA.

for reasons of complexity reduction: In the European survey, other aspects of the modes of interaction than intensity of collaboration were ignored. In the table, one can see that all administration and advocacy/opposition variables are factor scores, and both authorization policy aspects are not. The extent of pre-project planning by governments is taken directly from survey answers. The permit workload indicator is a self-calculated index that is the sum of weighted number of side (weight: 0.5) and main permits (weight: 1) that respondents indicated to need to operate at least a single large (meaning commercially viable or industrial-sized) wind turbine.

Bayesian testing

Now that the data has been transformed as to be usable for Bayesian analysis, the methodological proceedings for said links shall now be presented. The stylized textual equation (9.1) shows the basic model for link 2 that seeks to explain efficiency or the duration of the authorization procedure. Equations (9.2) and (9.3) do the same for links 3a and 3b, respectively:

$$dec_c + admin_c + adv\ or\ opp_c \longrightarrow eff_c \tag{9.1}$$

$$eff_c + GDP_c + pol\ den_c \longrightarrow inst\ cap_c \tag{9.2}$$

$$eff_c + GDP_c + pol\ den_c \longrightarrow real\ pot_c \tag{9.3}$$

where:

c	= country
dec	= decentralization
$admin$	= administration
$adv\ or\ opp$	= advocacy or opposition
eff	= efficiency
GDP	= GDP per capita, ppp-adjusted
$pol\ den$	= policy density (t+3)
$inst\ cap$	= installed capacity
$real\ pot$	= realized potential

Instead of frequentist levels of significance, posterior densities (also called posterior masses, abbr. "p.m.") above or below zero will be reported. With this method, readers can judge by themselves to what extent the posterior distributions for the relevant parameters (the resulting distribution for β's) satisfy material benchmarks of significance. The relatively low number of observations and the Bayesian understanding of statistical meaningfulness leads to an understanding of significance that is interpreted in the light of all models together, not necessarily strictly respecting the traditional frequentist boundaries of 10%, 5%, 1% and 0.1% significance levels.

For these three partial links, the testing strategy foresees the following procedure: In a first step, Bayesian linear regressions were estimated. These were called the "base models". Departing from these base models, a sensitivity analysis of posterior masses was conducted as a second step. For efficiency models, the study investigated what happens to decentralization measures when additional control variables are added. For deployment variables, the study tested what happens to efficiency posterior mass when additional controls are added. In a third step, the estimation of benchmark models with different degrees of theoretic restrictions was automated to investigate how posterior masses perform differently in theoretically specified models compared to benchmarks with fewer or no theoretic restrictions. Fourth and lastly, some Bayesian mediation analyses were conducted to further solidify the substance of the results.

The aim of this four-step procedure is twofold: First, each step represents a robustness check of base models — and this is especially important given the relatively thin empirical data that is used to update priors with. The number of available cases that update the prior for a model estimation may be as low as seven cases. Along with transparent prior specification, this makes in-depth robustness checks even more important. But at the same time, however, these procedural steps are much more than simply robustness checks, because, secondly, they present interesting additional information by themselves. Hence, there is no clear demarcation between what is considered substantive and what is considered robustness.[283] All Bayesian estimations were conducted in *R*, using the specialized packages.[284]

283 I mention this because reviewers of the chapter where previously trying to find shortcuts in reading the chapter, attempting to skip robustness, but the reader is hereby advised that the in-depth testing did not foresee to allow for this.

284 For data handling, the usual *tidyverse* package (Wickham et al. 2019) proved its usefulness. For Bayesian regression and mediation estimations, the packages *rstanarm* (Goodrich et al. 2020), *bayestestR* (Makowski et al. 2019), *rstantools* (Gabry

9.3. Explaining onshore wind energy deployment

After these in-detail data and methodological explanations, it is high time to examine the results. This section presents results of links 1a and 1b linking decentralization directly with both deployment variables. Table 9.2 shows summaries of the base models for installed capacity. Table 9.3 does the same for the deployment variable of realized potential.

What can be detected substantively? First, looking at the models of installed capacity, it is obvious that self-rule does not turn out to be significant across these simple models, concurring with the expectation of an unclear pattern due to the manifold possible positive and negative ways with which decentralization can affect installed capacity. In fact, it is surprising to see that model 4 (in table 9.2), relating all three independent variables with installed capacity, is still significant, even with DK-correction at the 10%-level. In model 3, one can see that the impact of self-rule vanishes if the models control for GDP per capita. In model 4, the size of the coefficients is roughly half of what they were in models 2 and 3 (self-rule compared to model 2). Similar reductions, although not equal in size, can be seen in model 8 compared to models 6 and 7 regarding realized potential. What is more, the control variables of policy count and GDP per capita are consistently and highly significant across all model specifications for realized potential. Self-rule has a more significant effect and a six times more sizeable coefficient on installed capacity than on realized potential (model 4 vs. model 8). This is in line with the expectation that income plays an accrued role regressed against a measure of tenacity of a country's WE-expansion.

Let us interpret the coefficients of model 4, taking the logged DVs into account: A 1-unit increase in self-rule would lead to a 5.6% increase in logged installed capacity. Self-rule ranges from 0 (lowest in the sample: Estonia, Iceland, Latvia 2000–2008, Luxembourg, Malta) to 26.53 points (highest in the sample: Bosnia and Herzegovina since 2015), a 1-unit increase hence meaning 3.8% (= 1/26.53) of the observed range of self-rule. 1 unit represents about 1/8$^{\text{th}}$ of its SD. In terms of installed capacity in MW, a 5.6% increase to the geometric mean projects an additional 55.53 MW of installed capacity, which represents an additional 19 modern wind turbines[285] for 1 added point in self-rule. This does not seem very large, but if instead of

et al. 2020) and *bridgesampling* (Gronau et al. 2020) were used. Data distribution resemblance was estimated using the *gamlss* package (Stasinopoulos et al. 2018).

285 The standard case of a 3-MW turbine is used for interpretations henceforth.

1 point in self-rule 1 SD is added, then we are already at 428 MW of added installed capacity. Again, this is not enormous in terms of effect size, but it is certainly meaningful.

By comparison, an increase of the (time-adjusted) policy count by 1 (observed range from 0 to 16, the latter corresponds to Spain 2018) would lead to a 12.8% increase in installed capacity, which would represent an additional 126.9 MW of installed capacity or 42 modern-capacity wind turbines. This is only for an increase of a single policy. With regards to GDP per capita, a 1% increase would mean an additional 3.4% of installed capacity, equaling approximately eleven additional wind turbines. However, the model just interpreted (model 4) is a random effects model, which is problematic as this comes with the strict assumption that any unobserved variables be strictly uncorrelated with the error term, which, in reality, is rarely the case (see, e.g., Allison 2009). So it must be assumed that coefficients in the random effects model are biased even if its standard errors have been corrected. However, using fixed effects for the explanation of self-rule effects is also problematic because self-rule shows little variability over time per country; therefore, fixed effects will have troubles explaining minimal within-variance to explain changes in the dependent variable.

Moreover, looking at the differences in significance across both standard-error corrections for the variable of self-rule in model 4, it is striking to see that significances due to the correction for heteroscedasticity only (HC) and due to correction for heteroscedasticity and cross-sectional dependence (DK) are actually different. The model points towards the presence of cross-sectional dependence serving as a detractor to significance in the model. Or, put differently, the correction for unobserved common factors of the countries, such as, for example, an economic shock, makes for a more certain effect. This gives credit to an important role of unobserved common factors that counteract institutional effects.

The potential confounder of population size and land area size must briefly be addressed: Several additional panel models were estimated in which population size and/or land size as independent variables were included. Their inclusion boosted the significance of self-rule, but this is likely due to multicollinearity. Centering the data did not solve the issue. If, however, self-rule was removed from the models and effects of population size were estimated instead, it showed significant positive effects in most cases, in both fixed and random effects specifications. Hence, it cannot be excluded that the self-rule effects are population-size effects in reality. Remember that the inverse, population being a proxy for self-rule, could equally be true.

Table 9.2: Summaries of panel analysis of "base models" checking for the effects of self-rule on the deployment measure of installed capacity.

DV: installed capacity (log)

		RE			**FE**			**FE**			**RE**		
		Model 1			*Model 2*			*Model 3*			*Model 4*		
		Est. β	HC	DK	Est. β	HC	DK	Est. β	HC	DK	Est. β	HC	DK
IV:	Self-rule	0.143	**	***	0.094	*	**	-0.006			0.056		*
	Policy density (t+3)				0.313	***	***				0.128	***	***
	GDP pc (log)							4.838	***	***	3.439	***	***
Adj. R^2		0.052			0.427			0.562			0.598		
Data		No obs: 537; years incl: 6–19; countries incl: 32											

Notes: *p<0.1; **p<0.05; ***p<0.01. "FE" stands for "fixed effects" and "RE" for "random effects". "HC" shows significance levels for heteroscedasticity-consistent standard errors following White (1980, 1984) and Arellano (1987). "DK" shows significance levels for standard errors according to Driscoll and Kraay (1998). Only recommended RE/FE-models following the indication of the Hausman test (1978) are shown.

Table 9.3: Summaries of panel analysis of “base models” checking for the effects of self-rule on the deployment measure of realized potential.

DV: realized potential (log)

		RE			**RE**			**RE**			**FE**		
		Model 5			*Model 6*			*Model 7*			*Model 8*		
		Est. β	HC	DK	Est. β	HC	DK	Est. β	HC	DK	Est. β	HC	DK
IV:	Self-rule	0.088		**	0.07	**	*	0.001			0.008		
	Policy density (t+3)				0.303	***	***				0.085	**	***
	GDP pc (log)							4.853	***	***	4.045	***	***
Adj. R^2		0.022			0.491			0.675			0.684		
Data		No. obs: 490; years incl: 7–19; countries incl: 28											

Notes: *p<0.1; **p<0.05; ***p<0.01. “FE” stands for “fixed effects” and “RE” for “random effects”. “HC” shows significance levels for heteroscedasticity-consistent standard errors following White (1980, 1984) and Arellano (1987). “DK” shows significance levels for standard errors corrected according to Driscoll and Kraay (1998). Only recommended RE/FE-models following the indication of the Hausman test (1978) are shown.

Table 9.4: Summaries of mixed models checking for the effects of self-rule on the deployment variable of installed capacity.

DV: installed capacity (log)

Model no.	1	2	3	4	5	6
	AR1	Pool AR1 & HC	AR1	Pool AR1 & HC	AR1	Pool AR1 & HC
Fixed						
Self-rule	0.069**	0.007	0.064**	0.018*	0.064**	0.02*
Policy density (t+3)	0.106***	0.042***			0.066***	0.04***
GDP p.c. (log)			3.162***	2.27***	2.941***	2.206***
Random slope p.c.		NA		NA		NA
Self-rule	x		x		x	
Policy density (t+3)	x				x	
GDP p.c. (log)			x			
AIC	1,001.998	574.175	934.874	472.009	934.081	462.701
BIC	1,049.083	728.27	981.959	626.103	985.423	621.006
Data	No. obs: 537, years incl: 6–19; countries incl: 32					

Notes: *p<0.1; **p<0.05; ***p<0.01. All models were estimated using REML. AIC and BIC-scores cannot be compared across model groups. “AR1” denotes the inclusion of an autoregressive correlation of lag 1 for serial correlation correction. “Pool AR1 and HC” indicates a pooling model (not a mixed model) that has been corrected for serial correlation and for heteroscedasticity (HC) by weights.

Table 9.5: Summaries of mixed models checking for the effects of self-rule on the deployment variable of realized potential.

DV: realized potential (log)

Model no.	7	8	9	10	11	12
	AR1	Pool AR1 & HC	AR1	Pool AR1 & HC	AR1	Pool AR1 & HC
Fixed						
Self-rule	0.044	0.006	0.037	0.017	0.037	0.018*
Policy density (t+3)	0.096***	0.044***			0.055***	0.041***
GDP p.c. (log)			3.675***	2.434***	3.479***	2.357***
Random slope p.c.		NA		NA		NA
Self-rule	x		x		x	
Policy density (t+3)	x				x	
GDP p.c. (log)			x		x	
AIC	805.197	452.429	696.617	344.341	705.123	334.679
BIC	851.268	586.454	742.688	478.366	772.103	472.823
Data	No. obs: 490, years incl: 7–19; countries incl: 28					

Notes: *p<0.1; **p<0.05; ***p<0.01. All models were estimated using REML. AIC and BIC-scores cannot be compared across model groups. "AR1" denotes the inclusion of an autoregressive correlation of lag 1 for serial correlation correction. "Pool AR1 and HC" indicates a pooling model (not a mixed model) that has been corrected for serial correlation and for heteroscedasticity (HC) by weights.

Moreover, and importantly, self-rule in model 4 with the fully corrected standard errors is only significant at the 10%-level, so strictly speaking it should not be attributed too much material meaning. However, what can be interpreted is the following: If the base model 4 shows an effect, it can be considered small and positive on installed capacity. It is especially small compared to effects of the control variables. For realized potential, one can only report a clear and unequivocal null finding regarding potential self-rule effects.

In addition, some mixed models were estimated. Their results can be seen in table 9.4 for the deployment variable of installed capacity and in table 9.5 for realized potential. The mixed-model advantage is to reduce assumptions where intercepts and slopes are allowed to vary randomly. In short, a similar picture like the one from single-level panel analyses emerges: Self-rule seems to be a marginally significant explanatory factor for the dependent variable of installed capacity, whereas for the realized potential it is generally not significant, even though in the full model number 12 self-rule shows significance at the 10%-level. Moreover, there is a large difference in model fit between the pooled and corrected models compared to the mixed models with the same IVs. Thus, it seems that the complicated structure of mixed models is not necessary for a good fit, indicating that random slopes are statistically unnecessary for the present data. However, just because statistics "says so" does not preclude that empirically mixed models are actually much more realistic and closer to the complexities of empirical reality.[286]

Next, estimates of the models 6 and 12 shall now be interpreted, presenting pooled and corrected models for both dependent variables of deployment. In model 6, a 1-unit increase in self-rule would lead to a 2% increase in installed capacity to the geometric mean, which represents an additional 19.8 MW, or 6 additional wind turbines. This pooled model has a coefficient that is a bit more than 1/3 in size of the estimate of the full random effects panel model (model 4 in table 9.2). In comparison, in mixed model 5 the magnitude is more than three times as large and significant at the 5%-level. An increase of the policy density by 1 in model 6 leads to a 4% increase in size, which is exactly the double of the self-rule effect. In terms of GDP per capita, a 1%

286 The models presented follow a statistical logic: For each fixed variable combination included I calculated AIC and BIC scores for each combination of random slopes and intercepts. Depicted in the tables is only the model combination with the lowest (best) AIC and BIC. All models contain random intercepts.

increase leads to a 2.2% increase in installed capacity (= 21.8 MW, 7 modern wind turbines).

Compared to the dependent variable of installed capacity in model 6 in table 9.4, self-rule has a slightly smaller effect on realized potential, whereas the coefficients for the policy-count and GDP-per-capita variables are slightly higher in model 12 in table 9.5. Self-rule impacts the realized potential for a 1-unit increase of self-rule, by 1.8% to the geometric mean, leading to an additional 0.01% of realized potential (arithmetic mean 2018 across the included 28 countries is at 1.6%). Policy density is projected to increase the realized potential by 4.1% and GDP per capita by 2.4% for an additional unit of policy density. However, it must be maintained that these small magnitudes hold for only a 1-point increase in self-rule, which has a very high SD in the sample of 7.7 index points. This to illustrate that the magnitude, if it were deemed significant, would be medium in size, but it is certainly non-negligible.

The role of population size was also tested in these mixed models. As for the single-level panel models, population size shows a positive effect if self-rule is removed from the models certainly (also) due to multicollinearity. Like before, the mixed models bring no certainty whether the driver behind the equivocal significance of self-rule is population or whether the inverse is the case. Overall, granted these equivocal empirics, we realistically find ourselves somewhere between the null and a positive relation between self-rule and installed capacity, but with a clear null effect on realized potential.

9.4. Explaining authorization procedure efficiency in Europe

This section models link 2 in this chapter's analytical model (see figure 9.1). It tests whether decentralization has an effect on the efficiency of the authorization procedure of onshore WE-projects in European countries. Efficiency is understood as negative duration: The higher the duration, the lower the efficiency. Duration, according to Ceña et al. (2010), is measured in months and denotes how long it took an implementation arrangement to hand out the definite authorization permit or refusal decree. All factors of these implementation arrangements stem from the data collected in the European expert survey. Formula (9.1) in section 9.2.2. presented the basic modeling strategy, with decentralization, administration and advocacy/opposition factors as IVs and efficiency as the DV.

A word on why it is important to explain the efficiency of these authorization procedures is in order: Aside from the literature that has often noted the importance of authorization procedures and their duration (Diógenes et al. 2020; Boie et al. 2015; Lüthi and Prässler 2011; Müller et al. 2011), the consulted experts in the European survey concur: All experts in the survey were asked to rank commonly heard political and administrative barriers in order of their importance (items based on Noothout et al. 2016). Together with the local population acceptance risks, they ranked the issue of "long and costly authorization procedures" as their two top concerns.[287] Hence, one can be sure that authorization procedure (and their efficiency) is really a defining issue for the sector of WE as well as for energy transitions in general.

Table 9.6 presents the base models for this second link. Model 3 shows a striking difference in coefficients compared to the bivariate models 1 and 2. Whereas mean self-rule (2000–2018) gives an indication of institutional decentralization, the measure of regional authorization differences captures the specific distribution of competences as a survey item. On an ordinal scale from 0–2, respondents could indicate whether there are no (= 0), small (= 1) or large (= 2) differences across regions in their respondent country. The variable of regional authorization difference shows consistently negative magnitude, not only in the base models (with posterior density in model 3 below zero of 97%, meaning 97% of the normal distribution of the estimate are estimated to be below zero). In model 2, the variable shows a smaller (but still sizeable) coefficient, yet its posterior mass is found at 99% below zero, 2% lower than in model 3. Mean self-rule astoundingly jumps from -0.4 (p.m. < 0: 93%) in a bivariate linear regression to +0.3 (p.m. > 0: 78%) when one further controls for the more proximate regional authorization differences. This indicates a likely mediation effect of regional authorization differences on the treatment of mean self-rule, which will be presented in due time further below.

The scores marked in bold in model 3 shall now briefly be interpreted. With regard to regional authorization differences, a 1-unit increase in the z-score of regional authorization difference indicates a diminution of the z-score of logged administrative lead time by 0.8.[288] De-standardizing -0.8 to logs[289],

287 I cannot exclude that there has been some self-selection into answering the survey: Those who participated in the survey are more likely to accord importance to the efficiency of authorization procedures, ceteris paribus. But based on the literature, I would not expect this to completely change the order of issues if this were the case.

288 I will fully walk the reader through interpretation steps only once.

289 z*SD+mean = log-score at mean; in numbers: $-0.8 * 0.35 + 3.63 = 3.35$.

Table 9.6: Summaries of efficiency base models.

		DV: Duration in months (=−efficiency)					
Model No.		1		2		3	
		β mean	P.m.* < 0	β mean	P.m. < 0	β mean	P.m. < 0
IVs:	Intercept	0.01	0.49	−0.07	0.61	-0.05	0.58
	Mean self-rule 2000–2018 (log)	−0.4	0.93			**0.3**	0.22
	Regional authorization diff.			−0.56	0.99	**−0.8**	0.97
Bayesian R^2		0.14		0.32		0.37	

Notes: *"P.m. < 0" stands for "posterior mass smaller than zero". All models are Bayesian linear regressions based on 50,000 iterations, 4 chains with a thinning of 10, a delta of 0.95 and sparse estimation technique. Semi-informative prior with mean zero and SD of 2.5 with enabled autoscaling were used.

a log-score of 3.35 results, which, inverted (= e^3.35), equals 28.48 months. This is 9.15 months less than the geometric mean of authorization procedure duration of 37.64 months. An increase of 1 SD to the right (34.14%), from the arithmetic mean of 0.84 to 1.68 of regional authorization difference (in its original scale from 0 to 2), hence leads to a decrease of 9.15 months in authorization procedure duration and thus to greater efficiency. In comparison, a 1-SD change in mean self-rule in model 3 changes logged authorization procedure duration by 0.3 SD. This results in a duration of 41.78 months, which is 4.15 months higher than its geometric mean. 1 SD (+34.14%) of logged mean self-rule yields an increase of 7.13 points to the geometric mean self-rule score of 12.71 points. Hence, with an increase from the mean of 7.13 self-rule-index points, the model foresees a relatively modest increase of 4.15 months of mean authorization procedure duration. However, with only 78% of posterior mass greater than zero, this finding is not consistently different from zero and one should not accord to it substantive meaning.

As a second step, a sensitivity analysis was conducted. It checks how posterior masses and the extent of explained variance change when additional variables are added to the base model (model 3 in table 9.6). Table 9.7 summarizes the results. All models only contain three independent variables (the two base variables and one additional variable). Regarding the Bayesian R^2, both the policy rules and the variables of the administration class do not add much to explaining the variance of authorization procedure duration. In contrast, however, the advocacy/opposition class adds a lot of explanatory power. Regarding posterior masses, there is barely a change if policy rules are included. However, the inclusion of either one of the administration variables leads to making effects of mean self-rule and of regional authorization differences more indistinguishable from zero, except for agency blocking. This measures the power of agencies to block the development of a WE-project, and its inclusion in the model leads to regional authorization being even more highly different from zero (0.99 of p.m. < 0), and a slight increase in average self-rule leads to 12% of p.m. < 0. The inclusion of agency blocking power hence leads to more statistical meaningfulness of the decentralization variables. It is argued that this is the case because higher agency blocking power is attributed more frequently to those agencies being able to act more autonomously, in more decentralized settings, increasing the importance of decentralization variables on authorization procedure duration. In the advocacy/opposition group one can see that the adding of all variables lead to mean self-rule effect being less indistinguishable from zero than the base model, but their inclusion does not have a strong effect on posterior masses of regional authorization differences. The strong increase in R^2, however, indicates that advocacy/opposition variables correlate strongly with the dependent variable.

The next step is to check whether model coefficients are robust to alternative model specifications by estimating benchmark models and then comparing them with the base model (no. 3). This is especially important, since, as the sensitivity analysis in the three-variable models has shown, there are important fluctuations across model specifications regarding posterior masses. Table 9.8 compares coefficients of three series of automated model estimations with each other. The principle for these models is that every possible IV combination (without permutations) is estimated. For the first column, 80 models were estimated with three independent variables, and the series was restricted to selecting 1 factor per class before estimation ("theory-guided restriction"). Then the mean of the 80 estimates per IV was taken. The second column also contains coefficients from 3-IV models (n = 286), but here no class restrictions were enforced. The third column presents coefficients in 5-IV models, averaged by IV across 1,287 models. Again, no class restrictions were enforced.

Table 9.7: Sensitivity analysis of Bayesian R^2 and posterior masses for decentralization variables.

	Bayes' R^2	**P.m. < 0 sensitivity**	
		Mean self-rule 2000–2018 (log)	**Reg. auth. diff.***
Base model (model 3)	0.37	22%	97%
Administration factors			
Administrative discretion	-0.06	-24%	+22%
Collaboration	-0.06	-20%	+18%
Conflict	-0.05	-29%	+26%
Agency blocking power	+0.08	+10%	-2%
Advocacy/opposition factors			
Civil society involvement	+0.09	-6%	+3%
Political involvement	+0.25	-21%	+4%
Opposition strength	+0.38	-20%	-2%
Opposition opportunity	+0.28	-14%	-2%
Policy-rules			
Pre-project governmental planning	+0.02	-4%	+0%
Permit workload index	+0.03	+2%	+0%

Notes: * "Reg. auth. diff." stands for "regional authorization differences". Example: Bayesian R^2 is larger by 9% when the factor of civil society involvement is included in the base model that otherwise contains mean self-rule (2000–2018, log) and regional authorization differences (z-scores). It enlarges the positive posterior mass of mean self-rule by 6%, from 22% to 28%, and it reduces the posterior mass of regional authorization differences from 97% to 94% below zero. All models estimated for this sensitivity analysis are Bayesian linear regressions based on 50,000 iterations, 4 chains with a thinning of 10, a delta of 0.95 and sparse estimation technique. Semi-informative prior with mean zero and SD of 2.5 with enabled autoscaling were used.

Table 9.8: Summaries of theory-guided vs. atheoretic benchmark models of authorization procedure duration.

Model series	**1 per var. class, n = 80, 3 IVs**		**No theory restrictions, n = 286, 3 IVs**		**No theory restrictions, n = 1287*, 5 IVs**	
	β mean	P.m. < 0	β mean	P.m. < 0	β mean	P.m. < 0
Decentralization						
Mean self-rule	-0.41	0.88	-0.31	0.8	-0.19	0.64
Reg. auth. diff.	-0.55	0.95	-0.6	0.96	-0.59	0.85
Administration						
Admin. discretion	-0.02	0.52	-0.002	0.5	-0.18	0.62
Collaboration	-0.11	0.6	-0.12	0.61	-0.13	0.6
Conflict	-0.09	0.58	-0.18	0.65	-0.02	0.51
Agency b.p.**	0.04	0.46	-0.02	0.52	-0.08	0.56
Advocacy/opposition						
Civil society involvement	-0.7	0.96	-0.67	0.95	-0.68	0.85
Political involvement	-0.14	0.59	-0.09	0.56	0.13	0.43
Opp. strength***	0.35	0.24	0.33	0.24	0.46	0.19
Opp. opportunity	0.35	0.24	0.34	0.13	0.31	0.19
Policy rules						
Pre-project gov. planning	-0.36	0.86	-0.19	0.71	-0.3	0.74
Permit workload index	-0.03	0.53	-0.04	0.56	0.11	0.38
Bayesian R^2	Median: 0.44, Mean: 0.43, SD: 0.17		Median: 0.40, Mean: 0.40, SD: 0.16		Median: 0.61, Mean: 0.59, SD: 0.16	

Notes: * 46 of the 1,287 models had divergent transitions during estimation, due to the high number of included variables and the low number of observations. ** “Agency b.p.” stands for “agency blocking power”. *** “Opp.” is an abbreviation of “opposition”. All models estimated as benchmarks are Bayesian linear regressions based on 50,000 iterations, 4 chains with a thinning of 10, a delta of 0.98 to 0.9999 and sparse estimation technique. Semi-informative priors with mean zero and SD of 2.5 with enabled autoscaling were used.

There are various substantive points that can be made when looking at the benchmarking results: First, all benchmark models present coefficients that are less different from zero than the ones presented in the base models (table 9.6) above. The average β-estimate of regional authorization differences ranges between -0.55 and -0.6, while it showed -0.8 in previous models. Still, its posterior mass remained strongly negative, with a p.m. < 0 of -0.85 to -0.96. Along with regional authorization differences, the only variable that indicates consistently being different from zero in the benchmark models are the factor scores of civil society involvement.[290] Bayesian R^2-scores are marginally better across the averages of the theoretically guided series (column 1) than across the "atheoretic" benchmark models with three IVs. Also, the coefficients, if they are not roughly equal, tend to be more different from zero in the theory-guided benchmark series. With the 5-IV models (column 3), one can clearly see that the more variables are included for control, the higher the Bayesian R^2 will be on average. Last, the variable of mean self-rule is negative in all three benchmark series, whereas the coefficient in the base models changed to a positive one where the variable of regional authorization differences was included, indicating a mediation effect.[291]

As a last analytical step, the mediator role of regional authorization differences and the effect of mean self-rule on authorization procedure duration in a path-corrected model shall now be inspected. Figure 9.4 depicts the findings of the Bayesian mediation analysis graphically. The model contains the IVs of mean self-rule, the factor scores of conflict and of opposition strength, and the mediator of regional authorization differences. Covariate choice was made based on the positive Bayesian R^2-impact of the variables. A categorical variable of technical wind potential following Ryberg et al. (2019) and allowed to vary per country was added as a random component in the mediation model. As seen in the base and benchmark models, the total effect of mean self-rule on the duration of the authorization procedure is

290 1 SD of civil society involvement factor scores (range: -1.83 to 0.96) is projected to decrease the geometric mean of authorization procedure duration of 37.64 months by 7.8 to 8.1 months.

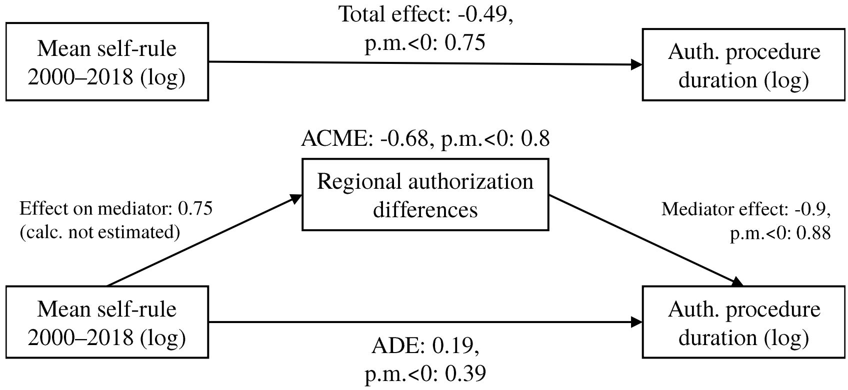
291 In the first series of these benchmark models, where one variable per class was included (column 1), the two variables were never in the same model, as per the theory restrictions. In the other series without restrictions (columns 2 and 3), this occurred but not frequently; thus, these occurrences did not suffice to make the mean effect of mean self-rule positive.

negative, higher self-rule leading to shorter authorization procedure duration and, thus, higher efficiency. But at a posterior mass of 0.75 below 0, the effect is not very strong. However, as seen in the base models, the average direct effect, once regional authorization differences are controlled for, becomes slightly positive yet remains indistinguishable from zero, just like in the base model 3 (in table 9.6). The ACME is negative with a magnitude of -0.68 and posterior mass below zero at 0.8. In addition, the mediator effect of regional authorization differences on authorization procedure duration is highly negative, with a stronger magnitude than what it is projected to have directly (compare model 2 vs.model 3 in table 9.6). A 1-SD increase in regional authorization differences is expected to lead to a diminution of 10.1 months from the geometric mean in authorization procedure duration. Seemingly logical from a decentralization perspective, mean self-rule impacts the "more proximate" regional authorization differences positively. Hence, it seems likely that, once a more policy-proximate measurement of decentralization takes over, the embedding institutional setting becomes indifferentiable from zero.

All models from this section considered, what could be found regarding decentralization impacts on authorization procedure efficiency? More decentralized countries in their authorization policy, i.e. countries with higher regional authorization differences, lead to higher efficiency, meaning reduced authorization procedure duration or greater efficiency. Self-rule has no direct effect on said duration, especially if controlled for the more proximate measurement of authorization-procedure-specific distribution of competences. However, self-rule remains negative, possibly materially meaningful, if the latter is not controlled for. Overall, one may conclude that a positive relation between decentralization and efficiency (which is negative duration) is likely to very likely.

Regarding the variables of the implementation classes of administration, advocacy/opposition and policy rules, only the factor of civil society involvement could be found to be robustly associated with a reduction in authorization procedure duration. In light of the literature's focus on social acceptance, this should not come as a surprise: As many do, a positive effect of greater civil society participation could be detected (see Langer et al. 2018; Schweizer and Bovet 2016; Bidwell 2016; Stadelmann-Steffen and Dermont 2021). Opposition strength and opportunities, however, have not been found to systematically affect authorization procedure duration in European countries.

Figure 9.4: Mediation model graph with self-rule as treatment, regional authorization differences as mediator and authorization procedure duration as dependent variable.



Notes: Prop. mediated: 1.33 (median), 3.1 (mean), 286.76 (SD), p.m. < 0: 0.5; all coefficients have large confidence intervals at standard CI = 0.89, each includes zero. The means of the estimated posterior distributions are shown (not the medians). Estimated using 100,000 iterations, 4 chains, a thinning of 10, sparse data estimation technique, a weakly informative normal prior of mean 0, a SD of 2.5 and a delta of 0.98. A categorical variable of technical wind potential was added to the model as a random component modelled to vary by country.

The finding of greater decentralization having an efficiency-improving effect on the European level stands in opposition to the Swiss-centered result, where greater decentralization is associated with lower efficiency. This contrast points to Switzerland as a deviant case — one that cannot be explained by the models set up for the European level. This point is treated in section 10.1.3. in greater detail when the European study is compared to the Swiss-centered study.

9.5. Explaining onshore wind energy deployment in Europe using authorization duration as a predictor

Having modeled authorization procedure duration in the previous section, the aim of the current section is to check whether and how the physical deployment of onshore WE-turbines is explained by the duration of the authorization procedure, among other factors. The handing out of a final construction permit is regarded as a necessary but by itself insufficient condition for physical deployment. The duration in months captures an efficiency aspect of this necessary condition. For economic efficiency reasons, i.e. the higher planning and projection costs of longer authorization procedures plus the foregone income due to later production (opportunity costs), it could be expected that efficiency stands in a positive relation, and the duration of the authorization procedure therefore in a negative relation, with deployment: The longer the authorization procedure, the higher the planning and opportunity costs are and the fewer developers are willing to invest, ceteris paribus. Importantly, however, there are plenty of non-economic and non-developer driven factors that co-determine deployment. In fact, it is most likely that there is no one-directional road to higher deployment and that the null effect dominates in such exploratory quantitative settings.

Table 9.9 depicts for both dependent variables of deployment, i.e. installed capacity in MW (logged) and realized potential in % (logged), whether the duration of authorization procedures stands in possible explanatory relation to deployment. There are three different base models that are estimated: The first (fourth) explains installed capacity (link 3a) and realized potential (link 3b) with the three IVs of authorization duration procedure, mean GDP per capita 2000–2018 (PPP-adjusted and in intl. USD, logged, World Bank 2020) and the mean policy density dedicated to WE-production promotion (scraped from IEA-org). The second (fifth) adds a variable measuring the size of the land area in km^2. The third adds an ordinally-scaled control of WE-potential.

This is because the latter two not only affect deployment but are also likely to determine how efficient an authorization procedure is: Developers are likely to meet much more experienced public authorities in countries with greater land availability and greater potential. WE-potential is not controlled for in the realized potential models (no. 4–6), because the potential is the explanans already. Hence, the realized potential models only additionally control for land area.

Regressed against installed capacity, models 1–3 show that posterior masses of authorization procedure duration tend to be positive at 0.82 to 0.96. GDP per capita shows positive posterior masses of 0.47–0.87. Policy density reveals to be highly positive, with 0.96 to 0.99 positive posterior mass. The two additional controls make Bayesian R^2 increase strongly. In model 3, posterior mass of authorization procedures is 13% below zero, or 87% above it. So there is a tendency towards a positive effect of authorization procedure duration on installed capacity, but it is not beyond all doubts.

For realized potential, a strong positive effect of policy density can be detected again. The posterior mass of authorization procedure performs "worse" than for installed capacity, with a positive range of 0.63 to 0.9. It is also much weaker in magnitude than for installed capacity. In terms of posterior mass, GDP per capita is a bit more telling for realized potential, and land area size stands out strongly negatively. Larger area correlates with lower realized potential, it seems.

The coefficient of 1.27 in model 3 indicates that a 1-percent increase of the duration of authorization procedures leads to a 1.27% increase in installed capacity. If one examines 1 SD of authorization procedure duration (13.87 months, 34.14%), this leads to an increase in installed capacity of 43%. If one takes the geometric mean of installed capacity of 991.58 MW, this would equal an increase to this mean of 426 MW equaling the additional construction of approximately 142 modern wind turbines. In model 6, the magnitude is weaker and there is less confidence in the effect being different from zero.

These findings are surprising because they most certainly invalidate the economic efficiency argument: Higher installed capacity and realized potential tend to be associated with a longer duration of the authorization procedure, rather than with a shorter one. But it seems very unlikely that longer authorization procedures are a cause of greater deployment, unless the longer time brings other benefits that outweigh the negative effects of greater duration, such as less corruption, more investor security, better framework conditions, greater social acceptance, etc. Yet it is further realistic that the

Table 9.9: Base models of deployment with authorization procedure duration as an IV.

	DV: Installed capacity in MW (log)					
	Model 1		Model 2		Model 3	
	β mean	P.m. < 0	β mean	P.m. < 0	β mean	P.m. < 0
Authorization procedure duration (log)	0.31	0.04	1.02	0.18	1.27	0.13
GDP per capita (log)	0.28	0.13	-0.55	0.82	-0.05	0.53
Policy density (t+3)	0.41	0.04	0.46	0.01	0.44	0.01
Land area (km^2)			0.32	0.20	-0.53	0.74
WE-potential (ord.)					1.4	0.12
Bayesian R^2	0.32		0.38		0.43	

	DV: Realized potential in % (log)					
	Model 4		Model 5		Model 6	
	β mean	P.m. < 0	β mean	P.m. < 0	β mean	P.m. < 0
Authorization procedure duration (log)	0.26	0.37	0.3	0.1	0.94	0.2
GDP per capita (log)			0.69	0.02	0.37	0.25
Policy density (t+3)			0.89	0	0.48	0
Land area (km^2)					-0.64	0.96
Bayesian R^2	0.01		0.21		0.36	

Notes: All models are based on 50,000 iterations, 4 chains with a thinning of 10, a delta of 0.95 and a sparse estimation technique. Weakly informative priors with mean zero and a SD of 2.5 were used with autoscaling enabled. These models are not z-standardized.

direction of effect is inverted because greater deployment has led to an expansion of the authorization procedure to include many more aspects over time and a country's permitting experience. In other words, countries with an established WE-sector tend to take longer to grant a permit than countries where the sector is only marginally important.

The next step is to look at the sensitivity of the base models if additional variables enter the model. Table 9.10 shows how both the Bayesian R^2 (median values) and the posterior densities of the main independent variable, authorization procedure duration, changes if a single additional variable is added to the base models 1 and 5 in table 9.9.[292] The idea is to check if variables of the classes of administration, of advocacy/opposition and of policy rules affect the explanatory power of authorization procedure duration for deployment and, if yes, in which direction.

In terms of results, one can see that adding decentralization variables does not lead to substantive changes in posterior masses. Neither do added policy rules. Including the variable of regional authorization differences makes Bayesian R^2 increase substantially, but this does not lead to authorization procedure duration being more distinctive from zero. The magnitude of changes is higher when administration variables are added. Especially the scores of agency blocking power, which measure the power of an administrative agency as a veto force, increase R^2, but they also lower posterior masses and hence reduce the distinctiveness of the authorization procedure duration effect on deployment. Variables in the group of advocacy/opposition variables also add to R^2, and they let the posterior mass of authorization procedure duration become much more negative, leading to the conclusion of insignificance of authorization procedure duration. The variable of opposition strength notably lowers posterior density of administrative lead times by 63% and increases R^2 by 28%. It clearly weakens the already weak distinctiveness of procedural duration from zero when regressed against realized potential. The stark difference between the magnitudes of the three variable groups, with decentralization and policy rules clearly having the much lower sensitivity than the other two, points to a robust inclusion of institutional deployment explanations in the base models already.

292 These two base models instead of models 3 and 6 in table 9.9 were selected because of problems with divergent transitions in estimations with six IVs: Models 3 and 6 already have five IVs.

Table 9.10: Sensitivity analysis of Bayesian R^2 and posterior masses for authorization procedure duration.

	DV: Installed capacity in MW (log)		**DV: Realized potential in % (log)**	
	Bayes' R^2	P.m. %-changes	Bayes' R^2	P.m. %-changes
Base model (models 1 or 5) +	0.32	0.04 < 0	0.52	0.1 < 0
Decentralization				
Mean self-rule 2000–2018 (log)	+3%	-1%	+6%	+3%
Reg. auth. diff.	+9%	-1%	+17%	–5%
Administration				
Administrative discretion	+13%	-6%	+35%	-16%
Collaboration	+17%	-3%	+2%	-8%
Conflict	+13%	-5%	+11%	-14%
Agency blocking power	+15%	-17%	+14%	-21%
Advocacy/opposition				
Civil society involvement	+5%	-20%	+4%	-11%
Political involvement	+5%	-5%	+17%	-15%
Opp.* strength	+1%	-24%	+28%	-63%
Opp. opportunity	+14%	-14%	+24%	-36%
Policy-rules				
Pre-project gov. planning	+3%	-1%	+0%	-2%
Permit workload index	+3%	-1%	+0%	-2%

Notes: * "Opp." stands for "opposition". All models estimated for this sensitivity analysis are Bayesian linear regressions based on 50,000 iterations, 4 chains with a thinning of 10, a delta of 0.97 and sparse estimation technique. Semi-informative priors with mean zero and a SD of 2.5 with enabled autoscaling were used.

In addition, some benchmark models were estimated to evaluate whether authorization procedure duration really has a marginally positive effect on installed capacity and less so on realized potential, as the base models claim. These benchmark models are shown in table 9.11 for installed capacity and in table 9.12 for realized potential. To avoid multicollinearity, Series 1 (in both tables) excludes those variables that explain R^2 of authorization procedure models most optimally. Series 2 does the same but excludes the "second best" combination of variables in terms of R^2 for authorization procedure duration. Series 3, in contrast to the first two, excludes the variable of authorization duration procedure and replaces it with all explanatory factors for authorization procedure duration. Series 1 and 2 with the DV of installed capacity encountered minor estimation problems (see notes). For both DVs, all series restricted possible IV-combinations by theory: Each model contains both "other controls" and a single variable of each class where decentralization and policy rules are taken together as a single class. All series are 5-IV models.

These benchmark models were estimated, as their name states, to have robust comparative benchmarks to evaluate the base models. As can be seen, for installed capacity (table 9.11) the only estimator that is consistently different from zero is the estimate of the factor scores of agency blocking power measuring the power of public actors to veto authorization decisions. This is strong evidence for the material importance of this factor: Diving further into the details, the study detected that the magnitude of the agency blocking power factor is especially strong when it is included as an explanatory factor together with civil society involvement. The most conservative of these estimates, in series 3, shows a magnitude of -0.37. This indicates that 1 SD in agency blocking power (in an observed range of -1.27 to 2.3 in z-scores) yields a decrease of installed capacity of 1,263 MW, or 421 modern turbines. Greater civil society involvement leads to even more pronounced agency blocking power.

Most importantly, however, the main variable of interest, authorization procedure duration, shows a very low estimate of 0.26 (p.m. < 0: 0.18) compared to the base models. A posterior mass above zero of 0.82 is certainly a clear tendency, but it is far from representing a certainty. Hence, it appears that the benchmark models reduce the likeliness of authorization procedure duration having a non-zero effect. As the sensitivity analysis showed, it is especially the advocacy/opposition class of variables that reduces the distinctiveness from zero of authorization procedure duration. It is astonishing, however, that at no point in the preceding data analysis did authorization procedure

Table 9.11: Summaries of benchmark models of installed capacity.

	DV: Installed capacity in MW (log)					
	controls + 1 per var. class, n = 36 each, 5 IVs, means				*ibid., n = 80*	
	*Series 1**		*Series 2**		*Series 3*	
	β mean	P.m. < 0	β mean	P.m. < 0	β mean	P.m. < 0
Auth. proc. dur. (log)	0.26	0.18	0.26	0.18		
Decentralization						
Mean self-rule			-0.13	0.72	-0.14	0.72
Reg. auth. diff.					-0.06	0.58
Administration						
Administrative discretion	0.06	0.41	0.06	0.41	0.05	0.44
Collaboration	-0.12	0.68	-0.12	0.68	-0.18	0.75
Conflict					-0.15	0.68
Agency b.p.	-0.41	0.98	-0.39	0.97	-0.37	0.98
Advocacy/opposition						
Civil society involvement	-0.27	0.82	-0.26	0.81	-0.24	0.81
Political involvement	0.04	0.44	0.03	0.45	0.05	0.43
Opp. opportunity	-0.1	0.68	-0.13	0.73	-0.05	0.58
Opp. strength					-0.23	0.79
Policy-rules						
Pre-project gov. planning	-0.05	0.59	-0.05	0.59	-0.12	0.69
Permit workload index	0.07	0.37			0.09	0.34
Other controls						
Policy density (t+3)	0.42	0.05	0.43	0.05	0.51	0.02
GDP per capita (log)	0.03	0.44	0.04	0.44	0.04	0.44
Bayesian R^2	Median: 0.57, mean: 0.55, SD: 0.15		Median: 0.57, mean: 0.55, SD: 0.15		Median: 0.56, mean: 0.54, SD: 0.15	

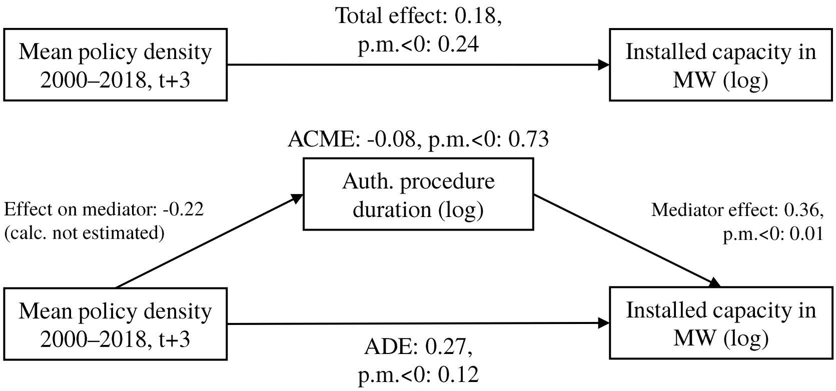
Notes: * 2 models in both series had a low number of divergent transitions during estimation, due to the high number of included variables and the low number of observations. Standard estimation of all models.

Table 9.12: Summaries of benchmark models of realized potential.

	DV: Realized potential in % (log)					
	controls + 1 per var. class, n = 36 each, 5 IVs, means				*ibid., n = 80*	
	Series 1		*Series 2*		*Series 3*	
	β mean	P.m. < 0	β mean	P.m. < 0	β mean	P.m. < 0
Auth. proc. dur. (log)	0.04	0.46	0.04	0.46		
Decentralization						
Mean self-rule			0.09	0.36	0.07	0.39
Reg. auth. diff.					0.15	0.32
Administration						
Administrative discretion	0.34	0.13	0.32	0.15	0.2	0.27
Collaboration	0.15	0.32	0.15	0.33	0.14	0.32
Conflict					-0.37	0.89
Agency b.p.	-0.12	0.67	-0.13	0.68	-0.13	0.7
Advocacy/opposition						
Civil society involvement	-0.09	0.58	-0.09	0.59	-0.06	0.56
Political involvement	-0.31	0.83	-0.3	0.82	-0.3	0.81
Opp. opportunity	0.09	0.37	0.09	0.37	0.15	0.27
Opp. strength					0.17	0.29
Policy-rules						
Pre-project gov. planning	0.07	0.39	0.07	0.39	0.07	0.39
Permit workload index	0.05	0.42			0.08	0.37
Other controls						
Policy density (t+3)	0.93	0	0.92	0	1.02	0
GDP per capita (log)	0.42	0.18	0.41	0.19	0.37	0.21
Bayesian R^2	Median: 0.71, mean: 0.68, SD: 0.14		Median: 0.71, mean: 0.68, SD: 0.14		Median: 0.73, mean: 0.70, SD: 0.14	

Notes: Models are estimated with a normal prior of mean 0 and SD 2.5, iter. = 50,000, thinning = 10 and 4 chains.

Figure 9.5: Mediation model graph with mean policy density as treatment, authorization procedure duration as mediator and installed capacity as dependent variable.



Notes: Controlled for GDP per capita. Mean effects are shown. Proportion mediated not meaningful because of opposite signs of the ACME and the total effect. All coefficients have confidence intervals at standard CI = 0.89, only the mediator effect does not include zero. 54 divergent transitions of a total of 20,000 transitions. Rhat = 1.000, effective sample size between 16,481 and 20,057. The graphical inspection yields that the divergences do not cluster around the pathological areas of the pair graphs. iter. = 100,000, 4 chains, thinning = 10, delta = 0.999999999999. The pairs plot available on request.

duration have a negative sign: The models, just like the base models, paint the picture of a positive controlled correlation with installed capacity. Again, this clearly defies arguments of cost efficiency and the standard economic argument.

What meets the eye when interpreting coefficients in table 9.12, which shows the benchmark models for the dependent variable of realized potential, is the general indistinguishability from zero of variables from all variable classes. Only the mean policy density control variable is strictly positive. The factor scores of political involvement show a negative tendency that is not bordering on certainty, however. The same can be said for GDP per capita, but with a positive effect tendency.

Most importantly for the present analysis, authorization procedure duration bears neither magnitude nor interpretable posterior mass, confirming the picture from the base models. Put differently, with regard to realized potential, the adding of capacity does not depend on the intricacies of institutions, administrations and the involvement of the public. Rather, what makes a country advance in terms of its relative onshore WE-capacity seems to be a greater policy density. For the absolute measure of installed capacity, where authorization procedure duration is more likely to have an effect, the measure can be said to be much more direct. A positive decision for deployment is a necessary and insufficient condition for each WE-project. But authorization procedure duration loses its explanatory power when realized potential is to be explained.

As a last step of this Bayesian analysis, the relation of authorization procedure duration with policy density shall be investigated: Policy density has shown a highly positive contribution to both dependent variables of deployment, and it is worthwhile to disentangle the effects of authorization procedure duration and policy density.[293] In fact, the direction of the policy density effect is unclear: It might be that existing authorization procedures spark the creation of new policies, or it could be the case that policies lie the foundation for an authorization procedure re-design. In consequence, authorization procedure duration and policy density will both be tested as mediators with the other variable serving as the treatment. In total, for both dependent variables this results in four mediation models, of which only those with the dependent variable of installed capacity are shown here. Results for the mediation models of realized potential are briefly discussed but not shown and are available upon request.[294]

Figure 9.5 above shows a Bayesian mediator model that uses authorization procedure duration as a mediator and mean policy density (t+3) as a treatment variable. It uses the same independent variable as the base model 1 in table 9.9, but in a mediation setup (see Goodrich et al. 2020). In terms of results, the model tempers the positive evidence of the policy density on installed capacity that has been found so far. In detail: In the mediation model, the ADE, controlled for the path over authorization procedure duration, shows an uncertain positive tendency, and the ACME is weakly negative, with a

293 To be clear, authorization procedures are based on policies as well, just in a different subject area (construction, spatial planning, environmental law). In the policy density indicator, only promotion policies are included.

294 Unfortunately, all models have a small number of divergences when estimated, but these do not cluster around pathological areas. Nevertheless, there might be small bias in estimates due to the estimation technique. Pair plots are available upon request.

negative posterior mass that is not highly different from zero. However, the mediator effect of authorization procedure duration is highly positive and clearly distinguishable from zero, fortifying the picture of an independent effect of authorization procedure duration on installed capacity.

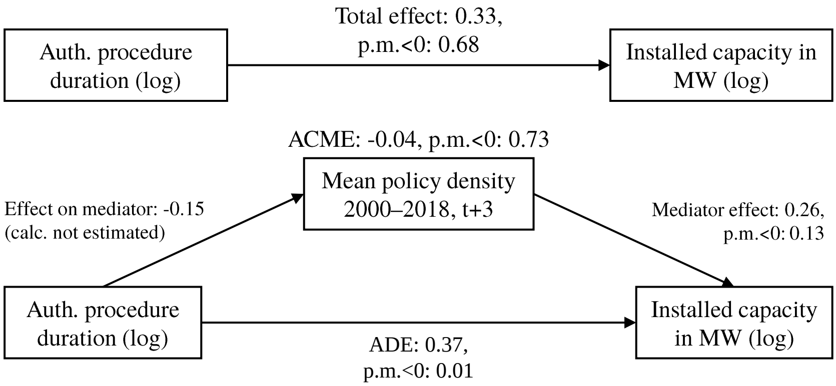
This picture is confirmed by looking at the inverse mediation model given in figure 9.5, where the mediator is the mean policy density and authorization procedure duration is used as the treatment. The direct effect of authorization procedure duration (ADE), controlled for the path of policies, remains positive and different from zero with high certainty and has a higher magnitude. The mediator effect is positive and may be maximally interpreted as a tendency. The ACME and total effects are insignificantly different from zero.[295]

When scrutinizing the mediation models in both directions for the dependent variable of realized potential instead, there is no confidence in the effect of authorization procedures being different from zero. This corroborates the picture of a non-existent effect of authorization procedure duration on realized potential. Policy density continues to be meaningful and positive, further corroborating its already detected positive effect. Checking what makes it more or less meaningful, the study further compared benchmark models where the policy density variables was included. It could be detected that, once further variables of the policy rules, administration and advocacy/opposition classes are added and the factor of authorization procedure duration is removed, policy density gets more meaningful. All in all, policies are likely to have a strong effect on the realized potential.

Overall, what could be found for links 3a and 3b? Authorization procedure duration has been shown to have a positive effect on installed capacity, but the finding cannot be classified as highly certain. But what can be said is that, if it is indeed meaningful, the effect is positive, not negative. For realized potential, there is a high certainty of a null effect of authorization procedure duration. This is likely to be the case because a country's relative potential is simply "too far causally removed" from a concrete authorization procedure for a WE-project. For both variables of deployment, policy density has been a consistently positive and meaningful predictor. The effect of authorization duration procedure is especially affected by variables of advocacy/opposition, which tend to make it less different from zero. The power of bureaucratic agencies to block has also stood out in the benchmark models. In mediation

295 For both models, the proportion mediated is not meaningful because the ACME and the total effect have opposite signs.

Figure 9.6: Mediation model graph with authorization policy duration as treatment, mean policy density as mediator and installed capacity as dependent variable.



Notes: Controlled for GDP per capita. Mean effects are shown. Proportion mediated not meaningful because of opposite signs of the ACME and the total effect. All coefficients have confidence intervals at standard CI = 0.89, only the ADE effect and the total effect do not include zero. 30 divergent transitions of a total of 20,000 transitions. Rhat = 1.000, effective sample size between 17,852 and 20,426. The graphical inspection yields that the divergences do not cluster around the pathological areas of the pair graphs. iter. = 100,000, 4 chains, thinning = 10, delta = 0.999999999999. The pairs plot available on request.

models, the positive effect of authorization procedure duration on installed capacity is somewhat tempered, but its direct effect, if policy density is accounted for as a mediator, still remains highly meaningful and positive.

9.6. Placing Switzerland in Europe

Where does Switzerland stand in European comparison? Drawing on the by now familiar classes of administration and advocacy/opposition variables, among other factors, table 9.13 compares the Swiss to the European mean (Switzerland included). It also adds the class of policy outcomes, containing authorization procedure duration, installed capacity and realized potential, and the decentralization factors. The table depicts the observed range, the

Swiss and European means, and the Swiss distance from the European mean in SD. Unless indicated otherwise, data is from 2018 (not averaged).

Let us examine the outcomes first. Switzerland's rank is low: With regard to installed capacity, Switzerland ranks 27th in a sample of 32 European countries and is trailed only by Malta, Iceland, the Slovak Republic, Serbia, and Bosnia and Herzegovina. Germany is the clear front runner, with 69,743% of Swiss installed capacity in 2018. The distance in SDs only shows a difference of −0.55 though. In terms of realized potential, Switzerland ranks 23rd out of 28 countries, leaving behind only the Slovak Republic, Serbia, Bosnia and Herzegovina, Latvia and Hungary. Concerning authorization procedure duration, the study from which this indicator is taken for European countries (Ceña et al. 2010) unfortunately provides no data for Switzerland, which is why the author had to code it himself. Ceña et al.'s (ibid.) procedure could not be exactly followed for Switzerland, which is why no distance in SD is given for this indicator. Still, the reader can be assured of their comparability. The differences in months of authorization procedure duration are very sizeable indeed: While in European countries there is a mean of 39.85 months and a range of 22.61–71.11 months that has been observed, duration in Switzerland has been 94 months for the earlier projects, when WE had not been as politicized, and 180 months for those in very recent and highly politicized times. These numbers are not even in the European range.

Regarding the decentralization indicator of self-rule (Hooghe et al. 2016; Shair-Rosenfield et al. 2021), the Swiss mean 2000–2018 is 0.7 SD higher than the European mean. The crude measure of competence distributions in WE-authorization procedure is closer to the European mean. Here, one would clearly not be able to speak of Switzerland as an outlier. Yet its high self-rule score could still be expected to play a role in why authorization procedures take so long and why there is very low installed capacity or realized potential. Regarding how the policies are implemented, conflict in Switzerland is the highest in the entire European sample. This is likely to be a blocking factor of authorization procedures as well. The power of an implementation agency to block is higher than the European mean, and administrative discretion is lower, indicating a strictly defined procedure in European comparison. Regarding indicators of advocacy/opposition, the strength of opposition in Switzerland is also exceptionally high. With 1.41 SD away from the mean, it is the highest opposition strength score in the entire European sample. The political involvement (involvement of politicians) is also decidedly more absent in Switzerland than it is in the average European country.

Because most SDs indicate that the Swiss case is in a normal range, not even close to an outlier range, the Swiss case, in fact, represents a deviant, not an extreme case (as suggested in the introduction). Following Seawright and Gerring's (2008) case selection terminology, a deviant case is one that implies anomaly in the theoretical and empirical *relation*. Thus, to be deviant, a case must demonstrate the absence of an otherwise present relation between independent and dependent variables. In contrast, an extreme case simply refers to an outlier status on one or multiple variable distributions of interest. It is not a deviant case if the outlier status can be explained by the applied theory.

Hence, to show that Switzerland is a deviant rather than an extreme case, the Swiss case must be "unexplainable" by the models that are used in the present chapter. When using an optimized model that explains 98% of R^2 of authorization procedure duration on the European level, a predicted duration for Switzerland of 48.8 months would result. But this prediction is off by factors 1.9–3.7.[296] This is an enormous difference that is unaccounted for by the highest variance-explaining model. When investigating model predictions for mean installed capacity and for realized potential, predictions for Switzerland using European data fare a bit better, especially given the larger range of the two indicators, but still overpredicting Swiss installed capacity and realized potential by a factor of at least 2.[297]

In summary, Switzerland does not fit the current models, even though it does not show large deviations from the European mean in the relevant indicators used to explain the duration of the authorization procedure and deployment in Europe. Switzerland is simply not explained well, especially regarding the duration of authorization procedures, not as much concerning installed capacity and realized potential. This makes Switzerland a deviant case regarding authorization efficiency in Europe.

What factors could explain this deviance? As there are no studies on the topic for Switzerland compared to Europe, a possible embedment in the scientific literature remains bounded by the enumeration of more or less likely factors that have not been incorporated in the present study: Judicial factors,

296 The model is a simple linear regression that contains logged self-rule, the permit workload index, and the factor scores of collaboration and opposition opportunity as independent variables. The predicted z-score of authorization procedure duration is 0.75, predicted log-score is 3.89, predicted months-score is 48.8.

297 Again, simple linear regressions with combinations of variables that maximize R^2 have been chosen to predict the Swiss scores.

Table 9.13: Switzerland's place in Europe with regard to decentralization and onshore WE-authorization procedures.

	Observed range	**CH mean**	**European mean**	**Distance* in SD**
Policy outcomes				
Mean installed capacity 2000–2018	0.83–26,991 MW	34	3,280	–0.55
Avg. realized potential 2000–2018	0.06–4.35%	0.00	1.22	-0.84
Authorization procedure duration	22.61–71.11 months**	94/181***	39.85	NA
Decentralization				
Mean self-rule 2000–2018	0–25.21, index points	18	13.25	0.7
Regional authorization differences	0–2, ordinal	1	0.84	0.19
Administration				
Administrative discretion	-1.63–1.52, fs****	-0.84	0	-0.84
Collaboration	-1.87–1.68, fs	0.38	0	0.38
Conflict	-1.31–1.32, fs	1.32	0	1.32
Agency blocking	-1.19–2.17, fs	0.88	0	0.88
Advocacy/opposition				
Civil society involvement	-1.19–2.17, fs	0.72	0	0.78
Political involvement	-1.65–1.69, fs	-0.91	0	-0.91
Opposition strength	-1.51–1.37, fs	1.37	0	1.37
Opposition opportunity	-1.51–1.92, fs	-0.08	0	-0.08

Notes: Data is from 2018 unless noted otherwise. * Distance of the Swiss scores from the European mean in SD. ** Switzerland not included in Ceña et al.'s (2010) wind barriers study. *** The indicated data for the Swiss authorization procedure duration stems from my own operationalization, which is different than Ceña et al.'s (2010) and thus cannot be compared 1-to-1. The first number indicates the mean duration of authorization procedures of operational projects, the second indicates the mean duration of those projects currently in the process of authorization. **** "fs" stands for "factor scores".

such as the number of possible appeals after a court decision, for example, remain unaccounted for. Moreover, lack of experience dealing with wind turbines could possible play a role as well (see Langer et al. 2018). Economic factors, such as the lack of institutional investors (Broughel and Wüstenhagen 2022), debates around scalability with RE-projects in Switzerland (Schmid et al. 2020) and a comparably tardy start of the Swiss RE-subsidy schemes (Switzerland: 2009; Germany: 2000; see Haelg et al. 2022) could equally explain part of this deviance. With regard to the literature on decentralization, it is also likely that effects of decentralization are highly contingent upon the institutional context (Mueller et al. 2017). Most prominently, however, the very important policy context (Johansson and Turkenburg 2004), as compared to the institutional context, has only been marginally integrated in the present European study. Moreover, the literature also suggests EU-membership (meaning the overarching policies associated with it) as an explanatory factor that could shape European deployment paths (Cia Alves et al. 2019).

9.7. Interpretation and limitations of the European chapter

This section serves to summarize and discuss the results from the models of this European study, relying decentralization with authorization procedure duration and this duration with two measures of onshore WE-deployment. The various relations will be discussed following the order in the chapter and the numbering in figure 9.7. In the present study, the expectation for the overarching links 1a and 1b between decentralization and deployment was that it does not stand in readily quantifiable relation to each other, because in theory too many linkages exist that either positively or negatively influence deployment. The same assumption was maintained for the second link between decentralization and authorization procedure duration. Regarding the effects of authorization procedure duration on deployment, the argument of economic efficiency was put forth, where longer duration of authorization procedures was expected to be in association with higher deployment.

Because much attention was given to not selectively choose and present only “the best” models and because the empirics are overall ambiguous, the summary cannot unequivocally support either one interpretation, as the meaningfulness of relations is prone to qualifications from modeling and estimation choices. As a consequence, it was decided to attach labels of confidence to the overall results, as is customary in Bayesian analyses.

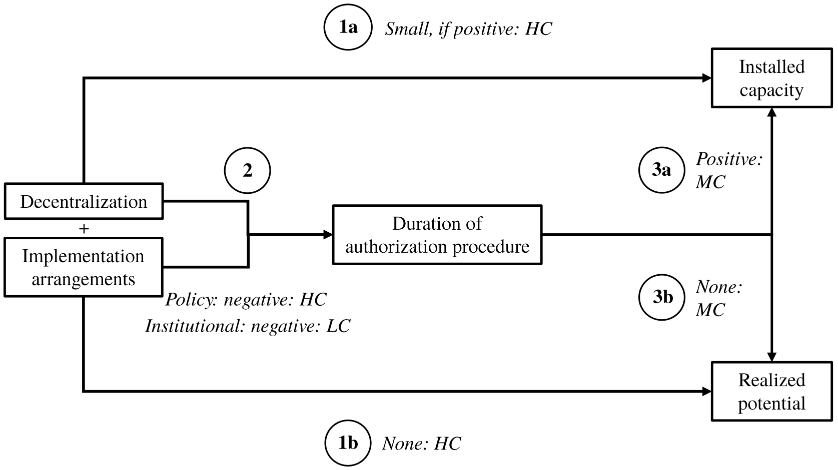
Hence, levels of confidence were added to the links in figure 9.7, where "LC" stands for "low confidence", "MC" for "medium confidence" and "HC" for "high confidence".

The links

For links 1a and 1b, which rely measures of decentralization to the duration of authorization procedures, the study resorted to using the RAI's (Hooghe et al. 2016) dimension of self-rule to measure institutional decentralization and regressed it against two measures of deployment, installed capacity and realized potential. The DV of installed capacity in MW measures how much electrical capacity of onshore WE has been built and is operational in a country at a given time. It is closely connected to the actual number of wind turbines installed and thus is regarded as a direct planning outcome. For installed capacity, having a final permit — a positive authorization procedure outcome — is a necessary but insufficient condition for deployment. The other deployment variable, realized potential, takes the number of installed capacity and puts it in relation to the technical installment potential, where the installed capacity is divided by the capacity that could realistically be installed in a country. This deployment measure designates how much of the potential is being harvested. It puts the emphasis on how "far" the WE-sector has been developed in a given country. Thus, the realized potential represents a relative measure of the extensiveness of societal effort ("tenacity", industrial "maturity"). In this sense, countries with a higher realized potential have pushed to go beyond the "low hanging fruit" and have installed turbines where it is costlier, since the cheapest and most productive sites are usually selected first. In summary, installed capacity is an absolute measure that is directly related to planning outcomes, while the other is causally more removed from authorization procedures, capturing the "tenacity" of a country's promotion efforts of onshore WE. Given the different meanings of the two dependent variables, it seems logical that self-rule does not have the same effect on the two.

First, regarding the relation between self-rule and installed capacity, the emerging pattern from all different frequentist panel and mixed models point to a marginally meaningful and positive relation. Higher degree of decentralization is associated with a higher installed capacity. The scatterplot shown in section 9.1. indicates a highly positive bivariate relation, but the

Figure 9.7: Discovered relations in chapter 9 on Europe's onshore WE-authorization procedures.



Notes: Analytical categories indicated by rectangular boxes, directions in italics, material content in regular font, links of correlational association in bold font. "HC" stands for "high confidence", "MC" for "medium confidence" and "LC" for "low confidence".

scatter is very large. The panel data models that analyzed the relation from 2000 to 2018 pointed to self-rule being a significant explanatory factor, but barely. The ensuing mixed models, which allow for the theorizing of individual panel errors, essentially give the same answer. Astonishingly, the controls of GDP per capita (World Bank 2020) and the policy density measure based on scraped IEA data (2021) are highly significant throughout —- and very unconditionally so. An increase of self-rule by 1 point (1/26.53 of the observed range) increases installed capacity by 2% to 6%, equaling 19.8 MW to 59.5 MW of additional installed capacity if one back-transforms the logged installed capacity and uses the back-transformed geometric mean as 100% baseline, as is customary. This is not huge but still sizeable in terms of effect magnitude. However, the positive effect is not robust across all specifications, and one would have to dive deep into the different standard error corrections for even more reliable estimates. Hence, this link may be classified as "small if positive". The author can attach a level of high confidence to this statement (see link 1a in figure 9.7).

For link 1b, modeling self-rule effects on realized potential, effect sizes and slopes are too small to be considered significant. The relation does not show the same slope in the scatterplot, and neither do panel and mixed-model results come out unequivocally. Hence, the tenacity of WE-growth in Europe could not be explained by the degree of institutional decentralization. In fact, it is likely that a relation exists that is too complicated to be captured by simple positive and negative relation terms and a magnitude that is formed by modeling choices. What was conspicuous, however, is the very strong relation and magnitude between GDP and realized potential, controlled for self-rule and for the policy density variable, which has shown to be robust throughout all specifications, SE-adaptations and randomized individual error modeling. The magnitude of GDP per capita is substantially higher when regressed against realized potential than for the DV of installed capacity, indicating that tenacity in growth promotion is associated with the richness of a country's population. There is also another possible explanation: Richer countries may let the growth of their WE-sector cost more. It could also mean that developers/investors in richer countries can afford to let sustained WE-growth cost relatively more, as WE-projects further along the percentages of realized potential are costlier, assuming that the most efficient sites are selected at the very beginning of a country's WE-growth. Richer countries, in this sense, can afford to have lower returns on investment. Regarding an effect of institutional decentralization, however, as indicated in figure 9.7, the author is highly confident that there is no statistical relation with realized potential.

Link 2, and to a limited extent links 3a and 3b, consider the much more fine-grained data on decentralization, administrative and advocacy/opposition factors, and policy rules stemming from the European expert survey. To model these relations, the study switched from frequentist statistics to a Bayesian approach. For estimations of these links, the time-series aspects are lost, and only cross-sectional evidence can be presented. Link 2 sought to find explanations stemming from the four classes of variables for authorization procedure duration (= negative efficiency). Authorization procedure duration indicates the number of months from the initial stage of project planning until the final authorization permit (grid, construction, operation).

In this second link, once self-rule is controlled for by another measurement of decentralization, regional authorization differences, as indicated by the survey's respondent experts, its effect disappears. The variable of regional authorization differences measures the "decentralization within WE-policy", meaning the distribution of competences for WE-authorization procedures. The measure is certainly more directly causally linked to authorization procedures than the pure measure institutional decentralization: In fact, in a mediation model with the variable of regional authorization differences serving as the mediator, the direct effect of self-rule as a treatment becomes statistically meaningless. In this model, the mediator of regional authorization differences retains a strong magnitude at meaningful posterior densities. The self-rule effect on regional authorization differences is positive, and the mediator effect on authorization procedure duration is highly negative. Even all non-mediation models, including the averaged benchmark-models (1,653 models estimated), corroborate the statistical meaningfulness of regional authorization differences clearly. The higher the regional authorization differences, the shorter the duration of the authorization procedure. The strength of the effect is considerable: A 1-SD increase in regional authorization differences (+34.14‰, from mean 0.84 to 1.68 on a range from 0–2) leads to a reduction of duration from −6.6 months to −11.2 months to the geometric mean. Considering the geometric mean value of duration of only 37.64 months, this is a large effect. The meaningfulness of the coefficients depends on the involved controls: Both self-rule and regional authorization differences crucially become less differentiable from zero when variables from the administration class are added. This provides evidence that administration modulates an institutional and policy-decentralization effect. The adding of advocacy/opposition variables also change the meaningfulness of self-rule but not the effect of regional authorization differences. Advocacy and opposition variables thus only lead to changes of the effect of institutional decentralization, not of effects of the more proximate policy decentralization measure.

Interestingly, the strength of civil society involvement is a consistently strong predictor with a negative effect on authorization procedure duration. 1 SD of civil society involvement (+34.14‰ from mean 0 on the range from -1.19 to 2.17) reduces authorization procedure duration in Europe by -7.8–8.1 months from the geometric mean, which is quite a substantial magnitude. Hence, to reduce authorization procedure duration, the analysis suggests that it is crucial to involve civil society. In summary, link-2 relations may be classified as negative with high certainty for the causally more proximate policy decentralization and with low certainty (also negative) for the self-rule effect.

Regarding link 3a between authorization procedure duration and installed capacity, the base models foresee a marginally meaningful positive impact of authorization procedure duration on installed capacity. The effect is boosted in magnitude when GDP per capita and the policy density variable are added as controls, but the effect shows less certainty of effect then. The variable of authorization procedure duration becomes meaningless in the models when the administrative factor of agency blocking or the advocacy/opposition factors of civil society involvement, opposition strength and opposition opportunity enter the models. That the power of agencies to block the authorization process makes authorization procedure duration meaningless as a predictor of installed capacity can be interpreted as the importance of power over life-or-death project-decisions with efficiency considerations suddenly being relegated to the background. The agency-blocking effect remains highly meaningful, even across all benchmark models. Regarding opposition variables that measure the scope and strength of obstruction possibilities, they have been found to reduce the positive impact of authorization procedure duration on installed capacity, indicating that these variables present non-negligible "bargaining chips" in authorization procedures (as seen in the sensitivity analysis). Again, efficiency considerations become unimportant compared to looming project refusals due to civil society or oppositional involvement. However, this statement needs to be tempered: The benchmark models do not show factors of the advocacy/opposition class of variables to be important on average, when controlled for decentralization and administration variables, to explain installed capacity. In mediator models, authorization procedure duration gains in its statistical meaningfulness both as a mediator and as a treatment. The magnitude of the effect of authorization procedure on deployment is broad across all estimated models, ranging from 88 MW to 426 MW added to the geometric mean (991.58 MW) of installed capacity for a 1-SD increase in duration (+34.14%, +13.87 months from the geometric mean). If one were to (incorrectly) assume proportionality, then 1 month more in duration would lead to an additional installed capacity of 6 MW to 31 MW, which is sizeable. Because the confidence in the effect is not in all models beyond all doubts, one may attribute the label of medium confidence for this positive relation of link 3a.

Link 3b aimed at finding effects of authorization procedure duration on realized potential. The study could not detect a meaningful effect if judged across all estimated models. This is already visible in the base model, where posterior masses maximally show 10% posterior density below zero or less. A similarly low meaningfulness can be seen in the mediation model that includes no other variables than the two controls of GDP per capita and mean policy density (not shown above). When additional control variables were included, all of them further reduced the posterior density of authorization procedure duration, if they have not left it roughly the same. In this case, the strength of advocacy/opposition variables renders the duration fully meaningless; especially the factor scores of opposition strength and opposition opportunity gnaw at the explanatory power of authorization procedure duration. Inspecting the benchmark models, the authorization procedure duration effect is fully non-different from zero. It could be detected that especially models that include the factor of opposition opportunity drive the factor of duration to statistical meaninglessness.

However, in the realized potential models, meaning can be attributed to the controls: The policy density variable is especially important for realized potential, where 1 SD in the mean policy density (+34.14%, +2.7 policies from the arithmetic mean) increase the realized potential by 16% to 35% of its geometric mean, which represents a very strong effect. In the frequentist panel and mixed models, GDP per capita is strongly significant, and in the Bayesian models it becomes more meaningful when the mean policy density is included in the models (not shown above), but less meaningful if other control variables, such as administrative and advocacy/opposition factors, are included. The size of the effect of GDP per capita amounts to a 0.37%- to 0.42%-increase in realized potential for a 1%-increase of GDP per capita. This also represents a large effect. Overall, however, with regard to the variable of authorization procedure duration, its effect on realized potential may be classified as null, with medium confidence.

Overall assessment

The empirical links show a likely positive link between decentralization and installed capacity, a negative link between decentralization and authorization procedure duration, and a positive link between authorization procedure duration and installed capacity. For link 1a to be positive, however, this requires that the negative link 2 has a negative effect of smaller magnitude than link 3a has a positive effect. This is hard to evaluate with certainty, although the findings of small effect size for link 1a, a large magnitude of link 2 and a similarly large link 3a leave it open whether this argument of empirical coherence can really be maintained.

The differing meaningfulness of links between decentralization and installed capacity on one hand and decentralization and realized potential on the other hand can be interpreted in the following way: Authorization procedure duration is an important determinant of installed capacity, but it cannot "carry the continuous weight" of sustained (tenacious) WE-growth if the most profitable and efficient sites have already been taken, as shown with realized potential.

The direction of the partial link 3a seems counter-intuitive. The study has presented evidence for a large positive relation, with longer authorization procedures being associated with higher installed capacity. A standard argument of economic efficiency would expect the inverse: A longer authorization procedure is more costly, risky and deters investors, resulting in the expectation of a negative relation. But the reader should keep in mind that these analyses present controlled correlations based on a cross-sectional and/or time-series cross-sectional research design. This means that the direction of the effect could also be inverted: Those with higher installed capacity have longer authorization procedures. And this, in turn, is also likely to be the case: The more authorization procedures are applied, the more deeply they get specified and defined, due to learned lessons by administrators from mistakes from the past. In non-experienced countries, the procedure is likely to be faster at first, because agencies cannot yet regulate "every unforeseen aspect" of impact. This is one explanation. The other could also be that the direction of effect is correct. Here, the following argument could be maintained: Longer authorization procedures reduce project opposition, because in such projects there are likely to be greater negotiations. Looming project refusals likely force developers to accommodate the opposition more strongly, thereby substantially delaying the project but reducing the opposition. Checking for a correlation between strength of opposition and duration of authorization procedure in the data at hand, it could be found that Spearman's ρ is negative between duration and opposition strength, as the argument would expect, but the correlation is not statistically significant.

Limitations

With regard to the findings from this chapter, the appropriate boundaries of applicability must be shown: In most cases, the survey has collected only a single expert opinion per country. Moreover, the number of observations is low in the Bayesian estimations. This means that the prior distribution assumption carries much weight in the results, and the data, with which the prior distribution is updated, are limited in its explanatory force. However, much care has been taken to normalize the distribution of dependent and independent variables, which led to difficultly interpretable double-transformed (z- and log-transformed) coefficients. Moreover, utmost care has been taken to model the Bayesian linear regressions validly by using an estimation technique that uses a sparse design matrix for estimation, thereby (partially) correcting for the low number of included observations (see Goodrich et al. 2020). Still, this approach coupled with few observations generates broad confidence intervals and posterior densities, especially in the mediation models. Hence the interpretation of statistical meaningfulness, although much more "relaxed" in the Bayesian framework than in the frequentist one, still needs to be handled with care.

Furthermore, some attention shall be given to three smaller limitations of the present analysis: First, for the Bayesian analysis, the data that are available over time had to be averaged for inclusion in the purely cross-sectional Bayesian linear and mediation regressions. This represents a loss of information. However, model fit metrics indicated that pooling the data in mixed models (corrected for serial correlation and heteroscedasticity) is preferable to models where the time dimension is part of the model, thus making it permissible to estimate cross-sectional regressions only. Problematically, and this is the second smaller limitation, this is not the only simplification, as, for reasons of interpretability, equidistance was assumed in categorical variable answers in the European expert survey. From a point of view of validity of measurement, this may have severe consequences, driving down the validity of measurement. The reason this assumption was made is to be able to predict factor scores based on few observations, the factor analysis modeling of non-equidistant category would have overcharged the limited factor estimation and score prediction feasibility. The third smaller limitation stems from the assumption of the functional form of the relationship that was assumed linear, log-linear or in the form of log-log-relations. The author would indeed be hard pressed to provide a theoretically well-founded answer for these choices, as the main motivation for these has been their simplicity. For all these reasons, this analysis does not dare to go beyond the label of "exploratory".

Contributions and further research

Despite its limits, this European study can make important contributions to the literature: Investigating an overlooked factor of deployment, authorization procedures of onshore WE-turbines in Europe, the study represents the first comparative effort (to the author's knowledge) on its effects on deployment in Europe. It finds a negative effect of decentralization on the duration of authorization procedure and a positive effect of the duration on installed capacity. It has added to the literature on deployment factors by calling for authorization procedures to be taken seriously: Most political scientists especially have so far focused on promotion policies, on effects of policy instruments or on social-acceptance effects on deployment. But here in the study it was argued that these literatures have so far missed a crucial point: Even if the technical, economic and/or political factors would predict the installment of capacity, the wide-ranging legal and administrative risks as embodied by the authorization procedure should not be neglected (see Noothout et al. 2016). Another contribution of this European study has been that effects of implementation factors that constitute an authorization procedure have specifically been included in an analysis, which is also novel. Moreover, the comparative focus of the study, from an implementation perspective, is also in line with the needs of the implementation literature (Hupe 2014).

Additionally, the study has also aimed to contribute to the literature on public-policy effects of (de)centralized political systems. It showed that, despite theoretic linkages pointing in all possible directions, the positive link of decentralization on installed capacity has held the upper hand. This is evidence for the "federal laboratory" hypothesis (Brandeis 1932): At least based on the data at hand, it can be shown that more autonomous regional planning as opposed to more central direction has promoted the growth of installed capacity. This finding also adds to the "energy federalism" literature, presenting a positive effect of greater decentralization for installed capacity of WE in Europe.

There are many possible avenues for further research. Out of the possible options, the author would suggest to seek greater "depth" first before looking for a "wider scope": At least two or three more expert interviews per country could make the data more reliable. For decentralization measures taken from secondary data, the analysis could be replicated with other indices than the dimension of self-rule. Additionally, to counter the data loss by averaging across time to make it suitable for cross-sectional Bayesian analyses, one could search for ways on how to capture the duration of authorization procedures over time. A further pathway would be to look deeper into a single country to trace the transmission of "causal force" (Beach and Pedersen 2013) between cogwheels of the relevant variables to be identified.