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When do decision makers listen (less) to experts? The Swiss government's implementation of scientific advice during the COVID-19 crisis

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Abstract

Under which conditions do politicians listen to scientific experts in a crisis? This study addresses this question by assessing how the Swiss government implemented 186 policy recommendations formulated by the National COVID-19 Science Task Force (STF) to combat the spread of the virus and alleviate its impact on the health system, society and economy during the first year of the pandemic. Results of multiple regression analyses show that the impact of problem pressure on the propensity of the government to implement experts' recommendations varies over time: it was considerably larger during spring 2020 than afterwards. We argue that this reflects a change in status of the STF during the second phase of the pandemic: it was distanced from the political-strategic level of the crisis management organization and its epistemic authority was increasingly questioned by political parties and interest groups. Policy scholars should thus give more attention to how rapidly the government's propensity to rely on expert advice can change.

KEYWORDS

COVID-19, experts, scientific policy advice

摘要

政客在一场危机中会在什么情况下听取科学专家的意见?为研究该问题,本研究评估了瑞士政府如何实施由国家 2019冠状病毒病(COVID-19)科学特别工作组(STF)制定的186项政策建议,以抗击病毒传播并减轻其在大流行第一年期间对卫生系统、社会和经济的影响。多元回归分析结果表明,问题压力对"政府在落实专家建议方面的倾向"的影响随时间推移而改变:问题压力在2020年春季的影响明显大于之后的时期。我们论证认为,这反映了STF在大流行第二阶段的地位变化:其远离了危机管理组织的政治战略层面,并且其知识权威越来越受到政党和利益集团的质疑。因此,政府依赖专家建议的倾向能多快地改变,这值得政策学者的更多关注。

关键词
2019冠状病毒病, 公共政策, 专家建议

Resumen
¿Bajo qué condiciones los políticos escuchan a los expertos científicos en una crisis? Este estudio aborda esta pregunta al evaluar cómo el gobierno suizo implementó 186 recomendaciones de políticas formuladas por el Grupo de trabajo científico nacional COVID-19 (STF) para combatir la propagación del virus y aliviar su impacto en el sistema de salud, la sociedad y la economía durante el primer año de la pandemia. Los resultados de los análisis de regresión múltiple muestran que el impacto de la presión del problema sobre la propensión del gobierno a implementar las recomendaciones de los expertos varía con el tiempo: fue considerablemente mayor durante la primavera de 2020 que después. Argumentamos que esto refleja un cambio de estatus del STF durante la segunda fase de la pandemia: se alejó del nivel político-estratégico de la organización de gestión de crisis y su autoridad epistémica fue cada vez más cuestionada por los partidos políticos y grupos de interés. Por lo tanto, los estudiosos de las políticas deberían prestar más atención a la rapidez con la que puede cambiar la propensión del gobierno a confiar en el asesoramiento de expertos.

PALABRAS CLAVE
COVID-19, política pública, asesoramiento de expertos

INTRODUCTION

The COVID-19 pandemic is the most severe global health crisis since the 1918 flu pandemic. It has also resulted in the most severe economic crisis the world has experienced since the 1929 stock market crash or the 2008–2009 financial crisis and bailout of major banks. Several studies have attempted to explain variation in national policy responses (Warner & Zhang, 2021; Corder et al., 2020 on the subnational US level; Toshkov et al., 2022 on the EU level), focusing, for instance, on the speed at which school closures or national lockdowns were imposed (Toshkov et al., 2022), the extent to which individual freedoms were restrained (Engler et al., 2021) and how different policy instruments were combined (Goyal & Howlett, 2021).

The "mushrooming" of scientific advisory bodies during the crisis (Daalen et al., 2020; Galanti & Saracino, 2021) has also led researchers to question the interaction between science and politics in different countries. Some studies indicate that politicians strongly relied on "insider" experts (i.e. members of institutionalized advisory bodies) but largely ignored non-certified advisors (Cairney, 2021; Hadorn et al., 2022). Moreover, following expert advice allowed elected politicians to shield themselves from criticism (Hinterleitner et al., 2023), to curb public controversy about unpopular measures, and to avoid (electoral) blame for policy failures in a policy context that was highly uncertain and fluid (Lavazza & Farina, 2020; on the 2009 H1N1 influenza pandemic, see Baekkeskov & Öberg, 2017).

Other scholars questioned scientific experts' influence on policymaking. They consider policy experts to be one policy actor among others providing advice in the policy process without enjoying a privileged position (e.g. Armingeon & Sager, 2022; Christensen, 2021). To investigate experts' actual influence on policymaking, one suggested approach is to examine their "preference attainment": policy scholars should concentrate on the policy recommendations that are explicitly formulated (in reports)

by advisory bodies and scrutinize whether this policy advice is eventually reflected in policy decisions (Christensen, 2021, p. 465).

Building on this research proposal, we ask the following question: when are recommendations by scientific advisory bodies more likely to be implemented? In answering this question, we seek to connect studies that focused on the timing of government policy responses (Warner & Zhang, 2021, e.g.) and those that addressed experts' position in the crisis management organization (Hadorn et al., 2022). We argue that the implementation (speed) of experts' recommendations depends on their status in the crisis management organization. We hence suggest that the timing of national policy responses might also depend on experts' status.

Empirically, this study assesses the extent to which the Swiss government implemented the recommendations made by the Swiss National COVID-19 Science Task Force (STF). The STF was established at the behest of scientists at the Swiss Federal Institutes of Technology (Hofmänner, 2021; Speicher, 2021). On March 31, 2020, it received a formal mandate from the Federal Office of Public Health (FOPH), the State Secretariat for Education, Research and Innovation (SERI) and the Federal Council's Crisis Committee for the Management of the Corona Crisis.[1] This mandate required the STF to provide the Federal Council (FC; i.e. the Swiss government) with independent scientific expertise during the crisis. Yet, very little is known about the extent to which and why the "success" of the STF recommendations varied in time between the "extraordinary situation" (March 16–June 19, 2020) with concentrated policy competences at the federal level and the "particular situation" (June 20, 2020 onwards) with shared policy competences between levels of government.

In the following study, we first detail our theoretical expectations as to how the government's reliance on scientific expertise varies over time depending on the interaction between problem pressure and the social legitimacy of the advisory body. Second, we present our research design. Third, we run multiple regression analyses of the degree and speed of the recommendations' implementation. The results support our expectation that problem pressure alone cannot account for the implementation of STF recommendations. Its influence is conditional on how closely experts are associated with the crisis management organization as well as on their epistemic authority. We find that the government was significantly more sensitive to problem pressure during the first phase of the pandemic in spring 2020 than from June 2020 onwards. The conclusion highlights the most important results while also pointing to some important caveats.

THEORETICAL EXPECTATIONS

We expect governmental authorities' propensity to demand and implement expert advice to increase when problem pressure increases. When a problem does not (yet) affect the public, governmental authorities feel less inclined to listen to experts' calls for action. The agenda-setting literature has explored the link between the measurable problem environment (e.g. the inflation rate) and policy agendas (Jones & Baumgartner, 2005, Chapter 8). Mortensen and Seeberg (2016), for instance, showed how observable socioeconomic problem indicators affect the size of the policy agendas of Danish municipalities. Similarly, and at a fundamental level, we expect governmental authorities' propensity to process scientific advice to depend on the severity of a given problem. Concretely, when hospitalizations are relatively low, we expect governmental authorities to pay less attention to the recommendations made by scientific experts. When decision makers pay less attention to expert advice, they are less likely to implement it. Accordingly, problem pressure increases the chances and speed of STF recommendations' implementation (Hypothesis 1).

However, problem pressure does not tell the whole story. The extent to which it affects the implementation of experts' recommendations depends on how governmental authorities process the advice of scientific experts. This, in turn, depends on the advisory body's access to governmental authorities and its epistemic authority.

First, when experts are granted direct access to the government at a political-strategic rather than a merely administrative level, expert advice is more likely to be implemented. As such, when experts can

"secure the ear of power" (i.e. when they can express their views directly to political decision makers), their recommendations are more likely to be implemented (Cairney, 2021). Furthermore, the extent to which experts enjoy *privileged* access depends on how closely other political actors (e.g. political parties, interest groups and subnational governments) are associated with the federal government. The impact of an information source (i.e. the STF) on a specific target (i.e. the FC) is always a multiplicative function of the strength of this information source, its immediacy and the number of competing sources (see the seminal article of Latané, 1981). As suggested by Armingeon and Sager (2022) for the case of COVID-19 in Switzerland, the return to the particular situation on June 20, 2020, required the FC to consult with the cantons (the members of the Swiss Confederation) prior to taking any measures. As a result, the FC may have been pressed to pay less attention to the STF. To avoid an input overload, the FC was obliged to pay less attention to STF recommendations after the return to the particular situation. Moreover, after the return to the particular situation, the FC was required to process the information received in the context of no less than six consultations on bills and ordinances related to COVID-19.

Second, when experts remain relatively unchallenged in their reading of a given emergency context (i.e. when experts' epistemic authority is not questioned), their advice carries greater weight and is more likely to appear in policy decisions. In fact, previous studies on the elaboration of H1N1 vaccination policies in Denmark, the Netherlands, and Sweden showed that experts succeed in guiding elected politicians if they create a unified front and maintain asymmetries between them and competing policy actors (e.g. political parties and interest groups but also elected authorities or citizens, Baekkeskov, 2016; Baekkeskov & Öberg, 2017).

Thus, the effect of problem pressure on the government's propensity to implement recommendations of scientific advisory bodies is not direct. Rather, it depends on the advisory body's (more or less exclusive) access to political decision makers and more generally on their (more or less uncontested) epistemic authority. Problem pressure affects the implementation of expert advice more strongly when experts enjoy privileged access to governmental authorities and when their epistemic authority remains unchallenged (Hypothesis 2).

Existing research on COVID-19 policy responses focused not so much on the implementation of expert advice, but rather on variation in policy responses across different jurisdictions. Nevertheless, some of the factors which explain variation in policy responses across jurisdictions are also relevant for the implementation of expert advice. Most notably, we cannot ignore the political nature of the decision-making process (Corder et al., 2020; Toshkov et al., 2022; Warner & Zhang, 2021). The timing of shutdown policies appears to have been strongly affected by governments' partisan coloring. However, these studies have not assessed to what extent experts' status affected policy responses. By studying the implementation of expert advice in a single jurisdiction, in which the partisan constellation remained constant throughout the pandemic, we seek to test whether experts' status affects the implementation of their recommendations. This in turn might have important implications for the timing of governments' policy responses.

RESEARCH DESIGN[2]

Our study compares the implementation of the Science Task Force recommendations during the extraordinary and particular situations.[3] To identify the STF recommendations, we collected all of their "policy briefs" issued between March 31, 2020, and June 30, 2021.[4] These policy briefs recommended 247 measures to the FC. On average, each policy brief contained 3.7 recommendations (*Mdn* = 2.5; *Max* = 16). Furthermore, 44 recommendations were repetitions, and 24 recommendations supported decisions that the FC had already taken. Therefore, when subtracting repeated and "ex-post" recommendations, the STF made 186 recommendations to the FC.

Our dependent variables measure (1) whether and (2) how rapidly the FC implemented the STF recommendations.[5] We assume that the FC communicated its most important decisions through press

releases so that citizens would change their behavior and follow the new rules. We are thus confident that we have captured at least the most important decisions. Between February 28, 2020, and June 29, 2021, the FC issued 179 press releases pertaining to the COVID-19 crisis.[6] These press releases allowed us to identify 739 measures taken by the FC to counter the spread of the virus and to alleviate some of its detrimental consequences on society and the economy. On average, each press release contained 4.1 measures (*Mdn* = 2; *Max* = 41). Once we had identified the measures taken by the FC, we could assess whether and when the FC implemented the STF recommendations.[7]

Our first dependent variable, which measures the degree of implementation, is ordinal and distinguishes between unimplemented, partially and fully implemented recommendations. We provide concrete examples of partially and fully implemented recommendations in the Appendix (Table A1). As shown in Table 1, 44% of the STF recommendations remained unimplemented by the end of the study (June 30, 2021). Due the ordinal nature of this dependent variable, we rely on ordinal logistic regression models in our analysis. The second dependent variable measures the speed of implementation. As the implementation of certain recommendations, particularly those made during the later stages of the pandemic, is situated beyond the conclusion of our observation period, we fitted Cox regression (survival) models to our data (for another application of survival analysis in the context of COVID-19, see Warner & Zhang, 2021).

We now present our independent variables. According to our first hypothesis, *problem pressure* positively affects the implementation of STF-recommendations. To measure problem pressure, we relied on the number of new COVID-19 related hospitalizations on the day the STF made its recommendation.[8]

According to our second hypothesis, the effect of problem pressure is moderated by the *status* of the STF. Problem pressure exerts a stronger effect on the implementation of recommendations when these are made by a relatively "high-status" STF. Status refers to both the formal status of the STF in

TABLE 1 Coding of variables and descriptive statistics.

Variable	Description	Mean	SD	Min	Max
Dependent variables (DVs)					
Implementation degree	Implementation of the Task Force recommendations. The three levels of this variable serve as the DV for the ordered logistic regressions				
Not impl.	The recommendation was not implemented at all	0.44		0	1
Partially impl.	Parts of the recommendation were implemented	0.21		0	1
Fully impl.	The recommendation in its entirety was implemented	0.35		0	1
Implementation speed	Time-to-event. If implemented (full or partial), number of days between publication and implementation of recommendation. If not implemented, number of days between publication and end of study. DV used for the cox regression models	239.9	155.44	2	448
Independent variables					
Problem pressure	Number of hospitalizations on the day the recommendation was made	52.39	69.51	0	293
STF-status low (ref: high)	Shift from the 1st phase of the pandemic (March 16, 2020–June 19, 2020) to the 2nd phase (June 20, 2020–June 30, 2021), coincides with a shift in the status of the STF from relatively high to relatively low	0.56		0	1
Economics & Social experts (ref: other)	Measures whether recommendations were made by 'Economics' or 'Ethics, Legal, Social' expert groups (rather than other expert groups)	0.33		0	1
Economic measures (ref: non-economic)	Economic measures/recommendations refer to (non-repayable) grants and payment reductions or referrals. Non-economic measures bestow rights and obligations on (groups of) actors, such as gathering limits	0.17		0	1
Solicited (ref: unsolicited)	Solicited recommendations represents answers to questions asked by the governmental authorities	0.55		0	1

the crisis management organization and its epistemic authority. We consider the STF's status to have changed during the pandemic. Its status was relatively high during the first phase, from March 16, 2020, to June 19, 2020, and relatively low during the second phase, from June 20, 2020, to June 30, 2021 (end of study).

In fact, during the first phase, the STF was formally attached to the Federal Council Coronavirus Crisis Unit (KSBC).[9] Its recommendations thus directly reached the political-strategic level of the crisis management organization. During the second phase, its advice was channeled through the COVID-19 Task Force of the Federal Office of Public Health before reaching the political-strategic level (Hofmänner, 2021, pp. 37–44).

The shift from the first to the second phase of the pandemic also coincided with the STF being increasingly subjected to criticism. To substantiate this claim, we conducted a Boolean keyword search in the archives of three newspapers: *NZZ* (Zurich, center-right orientation), *Tages-Anzeiger* (Zurich, center-left) and *Le Temps* (Geneva, center). We searched for articles mentioning the term "Task Force" in the vicinity of the term "criticism" (or some variant of it) and identified 63 articles (NZZ: 22, Tages-Anzeiger: 28, Le Temps: 13).[10] This allowed us to measure whether criticism of the STF increased during the second phase of the pandemic. Upon closer inspection, 24 articles (NZZ: 10, Tages-Anzeiger: 10, Le Temps: 4) contained statements criticizing the STF, all of which were published during the second phase of the pandemic. This shows that the social legitimacy of the STF declined during the second phase. Criticism was voiced by a diverse set of actors, including politicians from all the major political parties, members of the Federal Council, former members of the STF itself, interest group representatives and non-STF scientists.

Furthermore, it needs to be considered that the STF was not a monolith but comprised 10 standing expert groups.[11] Two expert groups provided advice on economic and social issues. However, these two groups stood in direct competition with peak-level business interest groups and trade unions, which, at least in formal terms, enjoyed the same status as the STF in the federal crisis management organization (Hofmänner, 2021, pp. 47–48). This close association has also been termed a "neo-corporatist reopening" (Sager & Mavrot, 2020). Recommendations made by the two expert groups focusing on economic and social issues are thus likely to have received less attention than the recommendations made by the other expert groups. We hence created a binary variable distinguishing between recommendations made by the "Economics" and "Ethics, Legal, and Social" expert groups and the other groups. Furthermore, we studied the content of the STF-recommendations to distinguish between economic and non-economic measures. Economic measures refer to (non-repayable) grants and payment reductions or referrals, while non-economic measures bestow rights and obligations on (groups of) actors, such as gathering limits. Table A2 in the Appendix provides concrete examples of recommendations made by the STF for both types of policy instrument.[12]

Finally, when governmental authorities do not solicit advice, they are less likely to pay attention to the content communicated by experts and thus less likely to implement it. As such, we control for the solicited versus unsolicited character of recommendations, that is, for whether they represent an answer to an explicit question asked by the governmental authorities.

RESULTS

In the following sections, we first present bi-variate analyses showing how the implementation of STF recommendations varies across phases and over time. In a second step, we conduct a series of multiple regressions.

Bi-variate analysis

Table 2 shows that a larger share of the STF recommendations remained unimplemented during the second phase of the pandemic, when we consider the status of the STF to have been relatively low. However, this difference is not statistically significant.

Nevertheless, a closer look reveals that there is considerable variation over time. Figure 1 presents the evolution of the overall implementation rate between February 2020 and June 2021 on a monthly basis. Additionally, it depicts the evolution of COVID-19 hospitalizations per day. These are our measure of *problem pressure*, or related strain on the health care system, which is our main independent variable. As suggested by Figure 1, the implementation rate was highest during April 2020 when 29 out of 38 (i.e. 76%) recommendations were implemented (partially or fully). The implementation rate appears to have been relatively low during the summer of 2020 (July to September) when hospitalizations per day were very low and the STF made relatively few recommendations (only 7 and 6 recommendations in August and September respectively).

Both the hospitalizations and the implementation rate increased in autumn 2020 when the second wave occurred. The evolution of the implementation rate thus mirrors the evolution of the hospitalizations, with spikes in the spring and autumn of 2020. This provides some suggestive evidence that the FC relies more heavily on experts when the strain on the health care system increases, as expected by our first hypothesis. However, the considerably higher strain on the health care system during the second wave did not increase the implementation rate beyond levels observed during the first wave. This becomes clear if we compare, for instance, the month of April 2020 (first wave) to the month of October 2020 (second wave). The average number of hospitalizations per day was roughly three times higher in October 2020 (115 compared to 37, as indicated by the squares in Figure 1). However, the share of implemented measures (either partially or fully) was higher in April 2020 (76% compared to 66%).

TABLE 2 Implementation of STF recommendations (row percentages).

	No impl.		Partial impl.		Full impl.		Total	
	N	%	N	%	N	%	N	%
1st phase	32	39.5	18	22.2	31	38.3	81	100
2nd phase	49	46.7	21	20.0	35	33.3	105	100
Sum	81	43.5	39	21.0	66	35.5	186	100

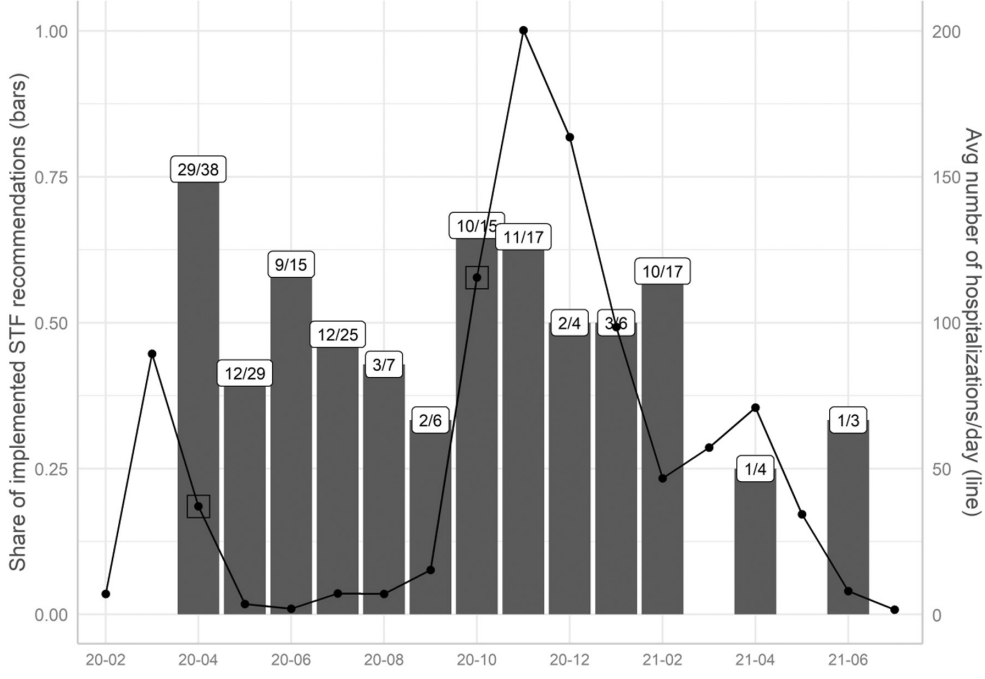

FIGURE 1 Share of STF recommendations implemented by the Federal Council by month.

We now consider the time elapsed between the publication of a recommendation in an STF policy brief and its implementation by the FC, which is the second dependent variable in our analysis. In Figure 2, we plot the "survival curves" of recommendations made during both phases. The curves indicate the survival probability of recommendations beyond a certain number of days after they were made. Both curves begin in the top-left corner of the figure when the survival probability is 100%. This simply demonstrates that recommendations were not implemented immediately. The survival curve for recommendations made during the first phase decreases more rapidly than the one for the second phase. This indicates that recommendations made during the first phase "perished" more rapidly (i.e. they were implemented more rapidly). For instance, the probability of recommendations surviving (i.e. remaining unimplemented) beyond 25 days is 75.9% during the first phase, whereas it is 87% during the second phase. We can also observe a gradual flattening of the curves, particularly beyond 125 days, which means that a sizable share of recommendations is likely to remain unimplemented. However, a log-rank test shows that the difference between these two curves is not statistically significant.

In sum, the bi-variate analysis reveals that the share of implemented recommendations and the implementation speed were higher during the first phase than during the second phase without these differences being statistically significant. Nevertheless, the significantly higher problem pressure during the second phase needs to be considered. A multiple regression analysis is thus required.

Degree of implementation

Model 1 in Table 3 shows the results of an ordered logistic regression explaining the degree of implementation (no, partial, full) of the STF recommendations. The results demonstrate that recommendations made during the second phase of the pandemic, when the status of the STF was relatively low, had significantly lower chances of being implemented once we control for problem pressure (hospitalizations per day). However, the problem pressure itself does not appear to affect the chances of recommendations being implemented (a positive but not statistically significant coefficient). At first sight, this appears to

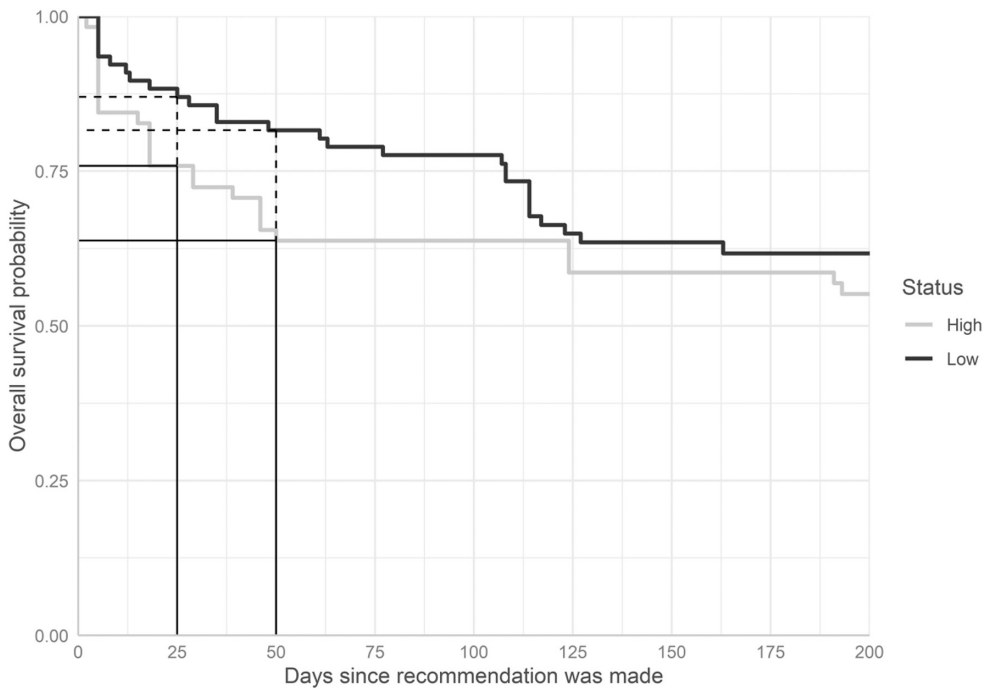

FIGURE 2 STF recommendations' survival curves according to first and second phases.

contradict our first hypothesis, but the absence of a statistically significant effect might be due to the problem pressure having a very weak effect during the second phase, which is compatible with our second hypothesis.

Model 2 in Table 3 thus considers how the status of the STF moderates the effect of problem pressure. The separate coefficient for problem pressure now measures its effect during the first phase, when the STF enjoyed a relatively high status. The separate coefficient for STF status now measures the effect of STF status when there is no problem pressure (i.e. no hospitalizations). The interaction term captures how the effect of problem pressure is moderated by the STF status. The separate coefficient for problem pressure (i.e. the effect of problem pressure when STF status was relatively high) is now significant, whereas the separate coefficient for STF status is no longer significant. That is, when there was no problem pressure, the status of the STF did not impact the chances of STF recommendations being implemented. The interaction term is significant and negative, which means that the effect of problem pressure was largely annulled when the STF status was relatively low.[13] Put simply, it took considerably more problem pressure (i.e. a higher number of hospitalizations) for STF recommendations to have similar chances of being implemented during the second phase, when the STF status was relatively low, as compared to the first phase, when the STF status was relatively high.

To attain a clearer view of the magnitude of the effects, Figure 3 plots the predicted probabilities of no, partial and full implementation calculated from the coefficients of Model 2. At low levels of problem pressure, differences between the two phases are relatively minor. However, and in support of H2, problem pressure exerted a (much) stronger effect on the implementation of STF recommendations when the STF status was relatively high than when it was relatively low. When the STF status was relatively high (i.e.

TABLE 3 Ordered logistic regressions explaining the implementation (no, partial, full) of STF recommendations.

	Model 1	Model 2
Problem pressure	0.004	0.035***
	(0.002)	(0.012)
STF status low (ref: high)	−0.829**	−0.208
	(0.334)	(0.406)
Economic & Social experts (ref: other)	−0.468	−0.663*
	(0.343)	(0.358)
Economic measures (ref: non-economic)	−0.679	−0.400
	(0.448)	(0.461)
Solicited (ref: unsolicited)	−0.518	−0.771**
	(0.322)	(0.340)
No impl. | Partial impl.	−1.083***	−0.718*
	(0.375)	(0.400)
Partial impl. | Full impl.	−0.167	0.229
	(0.367)	(0.397)
Problem pressure × STF status		−0.033***
		(0.012)
AIC	392.686	387.195
BIC	415.266	413.000
Log likelihood	−189.343	−185.597
Deviance	378.686	371.195
Num. of obs.	186	186

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

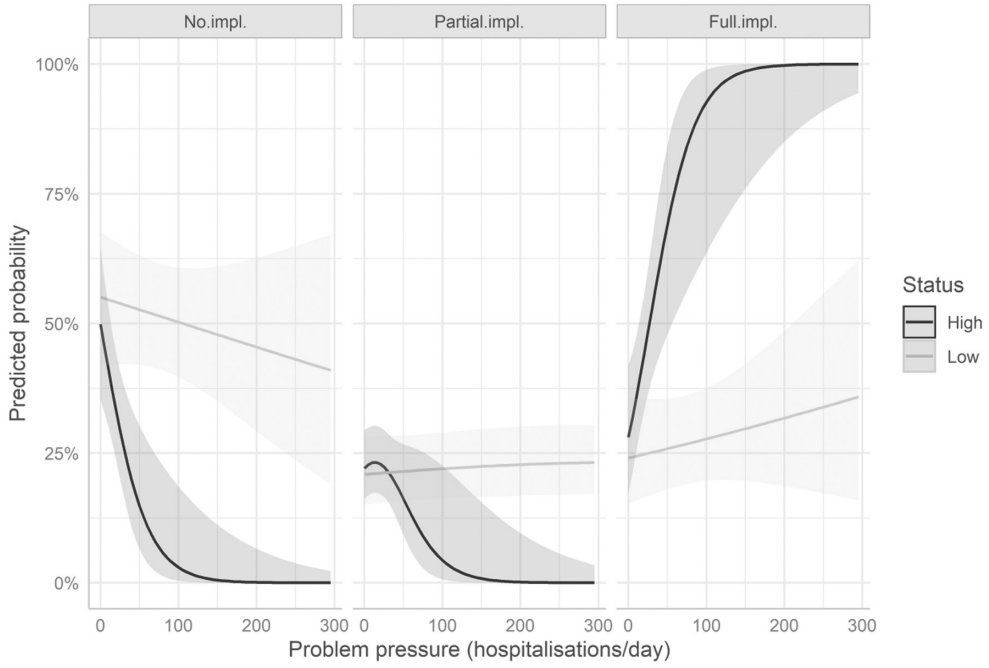

FIGURE 3 The effect of problem pressure on the implementation of STF recommendations.

during the first phase), the predicted probability of recommendations being fully implemented increases from 0.32 to more than 0.67 as pressure moves from 6 (1st quartile) to 47 (3rd quartile) hospitalizations per day. The same increase does not practically affect recommendations' chances of being fully implemented during the second phase (the predicted probabilities increase from 0.24 to 0.26). Conversely, the probability of no implementation decreases sharply when the problem pressure increases during the first phase but does so much less so during the second.

Commenting briefly on the other independent variables, recommendations made by the "Economics" and "Ethics, Legal, and Social" expert groups were indeed less likely to be implemented than those made by the other expert groups. The coefficient for economic measures is also negative, albeit not statistically significant. We argued that the close association of peak-level economic interest groups to the crisis management organization decreased the attention granted to STF recommendations within the "jurisdiction" of peak-level economic groups. Our results appear to confirm this expectation.

Contrary to our expectations, solicited recommendations had lower chances of implementation than unsolicited recommendations. When the federal authorities did not (explicitly) ask for advice, they were more likely to implement STF recommendations. Perhaps this reflects the federal authorities seeking the support of experts on more controversial decisions. Solicited recommendations might thus represent more controversial recommendations enjoying lower chances of implementation. It may also reflect how information asymmetries affect recommendations' chances of implementation. Information asymmetries between the federal authorities and experts might be larger when advice is not solicited. Consequently, the federal authorities might be more inclined to listen to experts when they are less knowledgeable.

These results proved to be robust to a series of additional tests (see Appendix). First, we dichotomized the dependent variable and ran a series of logistic regressions. If we consider partially or fully implemented recommendations as implemented recommendations (see Models 1 and 2 in Table A3, Appendix), then more problem pressures increase the chances of recommendations being implemented, particularly during the first phase, thus confirming H1 and H2. The results are also confirmed if we consider only fully implemented recommendations as implemented when dichotomizing the dependent variable (see Models 3 and 4 in Table A3, Appendix).

Second, we also conducted a multinomial logistic regression to confront any potential problems regarding the parallel slope assumption behind the ordered logistic regressions presented above. Results show that an increased problem pressure increases the chances of recommendations being *fully* implemented and that this effect largely disappears when the STF status is low (during the second phase). We observe similar but not statistically significant effects when focusing on the *partial* implementation of recommendations (see Table A4, Appendix).

Third, our results also hold if we log-transform the hospitalizations per day, thus accounting for a potentially non-linear relationship between hospitalizations and the recommendations' implementation (see Table A5, Appendix). That is, the effect of 50 additional hospitalizations (per day) is probably stronger when the baseline comparison is zero rather than 200 hospitalizations per day.

Speed of implementation

We now turn to the analysis of the recommendations' implementation speed, which is our second dependent variable. We modeled the lapse of time between the publication of a recommendation and its implementation. As the implementation of certain recommendations, particularly those made during the later stages of the pandemic, might be situated beyond the end of our observation period (June 30, 2021), we fitted Cox regression (survival) models to our data. As we lack the implementation date of certain recommendations, these models rely on only 135 observations. Model 1 in Table 4 focuses again on the separate effect of the independent variable (problem pressure) and of the moderating variable (status), whereas Model 2 also includes an interaction term between them.

Model 1 indicates that problem pressure (COVID-19 related hospitalizations per day) leads to an increase in the hazard that a recommendation is implemented. Put simply, an increase of problem pressure shortens the implementation time. We can also see that the coefficient for the STF status is negative: during the second phase, when the STF status was relatively low, the hazard of recommendations being implemented is lower. In other words, the implementation of recommendations took longer.

As can be seen in Model 2, the speed of implementation increases with the degree of problem pressure, but this effect largely disappears during the second phase of the pandemic (see Figure 4). For instance, the probability of recommendations surviving beyond 25 days drops from 88% to 31% as we move from 6 (1st quartile) to 47 (3rd quartile) hospitalizations per day when the STF status was relatively high. In contrast, when focusing on the right-hand figure, the difference in the probability of recommendations surviving beyond 25 days as we again move from 6 to 47 hospitalizations per day is relatively minor (97% as compared to 95%) during the second phase when the STF status was relatively low.

In sum, the analysis of the speed of implementation (Table 4) is very similar to the analysis of the degree of implementation above (Table 3). Whether we focus on the degree or speed of implementation, the effect of problem pressure (hospitalizations per days) is largely annulled during the second phase of the pandemic, when the status of the STF was relatively low.

CONCLUSION

Based on quantitative assessments of the degree and speed of implementation of recommendations formulated by the Science Task Force, our study investigates the conditions under which the Swiss government listened to scientific experts during the COVID-19 pandemic.

Problem pressure (as measured through the COVID-19 hospitalizations per day) had a considerably stronger impact on the degree and speed of recommendations' implementation during the first phase, when the STF status was relatively high, as compared to the second phase, when the STF status was relatively low. During the second phase of the pandemic, the STF was no longer attached to the political-strategic level of the crisis management organization, and societal actors (political parties, interest groups, subnational authorities and non-STF scientists) increasingly questioned the

TABLE 4 Cox regressions explaining the speed of implementation of STF recommendations.

	Model 1	Model 2
Problem pressure	0.01***	0.05***
	(0.00)	(0.01)
STF status low (ref: high)	−1.73***	−1.11**
	(0.43)	(0.50)
Economics & Social experts (ref: other)	−1.19***	−1.73***
	(0.41)	(0.43)
Economic measures (ref: non-economic)	−0.38	−0.05
	(0.49)	(0.46)
Solicited (ref: unsolicited)	−0.70*	−1.20***
	(0.36)	(0.43)
Problem pressure × STF status		−0.04***
		(0.01)
AIC	473.30	459.75
R^2	0.25	0.33
Max. R^2	0.98	0.98
Num. events	54	54
Num. of obs.	135	135
PH test	0.05	0.22

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

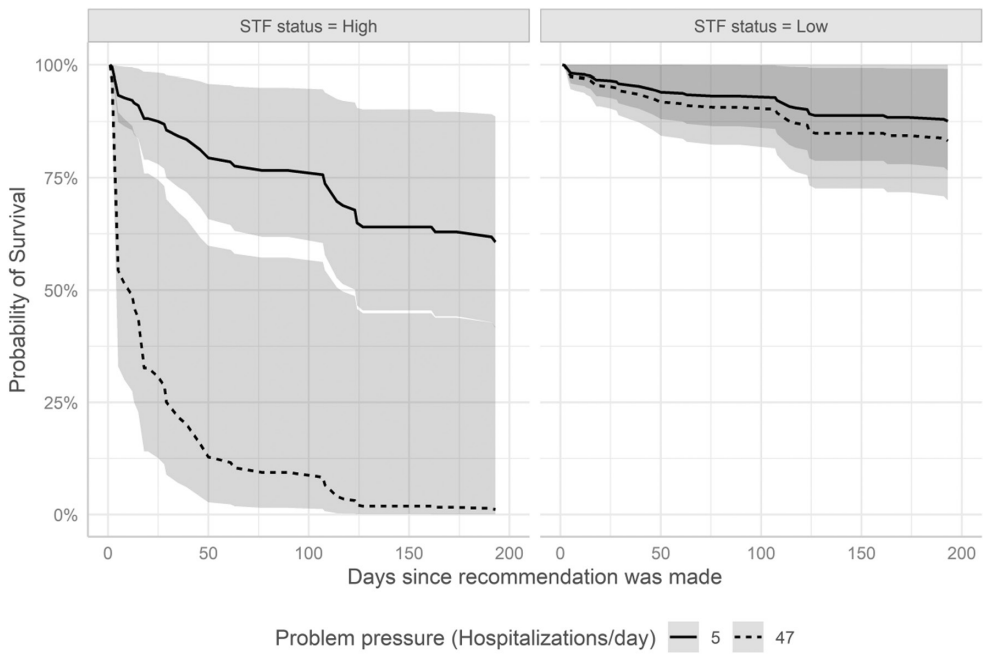

FIGURE 4 Fitted survival curves of STF recommendations.

legitimacy of the STF. Under such circumstances, an increase in problem pressure exerts no practical effect on the government's propensity to implement expert advice. The status of the advisory body thus moderates the effect of problem pressure and confirms our second hypothesis. It does so to such an extent that our first hypothesis is only partially confirmed: problem pressure exerts no effect on the implementation of STF recommendations when the status of the STF is relatively low. Our analysis confirms anecdotal evidence, often voiced by STF members themselves, that STF recommendations were implemented less during the second phase (Hehli, 2020). It might also provide an additional explanation as to why the Federal Council blamed the STF less during the second phase of the pandemic (Hinterleitner et al., 2023): it is risky to blame experts when their recommendations are being less followed. We further show that the implementation of STF recommendations depends on who (within the STF) makes those recommendations. Recommendations made by STF subgroups that stand in direct competition with peak-level economic interest groups have lower chances of implementation than those made by STF subgroups that do not address the economic and social consequences of the pandemic.

Several studies insisted that policies to manage the pandemic had a strong partisan coloring (Corder et al., 2020; Curley et al., 2021; Kettl, 2020). Focusing on the subnational US context, Warner and Zhang (2021), for instance, showed that political partisanship (whether the Republican party controlled the state legislature and governorship) and social safety nets crucially affected the timing of state policies on shutdown and reopening. Our analysis shows that expert recommendations were implemented more swiftly when experts enjoyed considerable epistemic authority and when they were closely associated to the crisis management organization. We focused on the Swiss case, in which the partisan constellation within government and parliament remained unaltered throughout the period of observation (and beyond). Moreover, easier access to partial unemployment benefits was decided on March 13, 2020, even prior to the establishment of the STF, and remained available throughout the pandemic. Differences in the implementation (speed) of experts' recommendations thus cannot be explained by changes in the partisan constellation within the government and parliament or changes in the availability of social protection during the studied period. Our study hence suggests that the timing of state policies to manage the crisis might also depend on experts' status, which is not wholly determined by who is in government and can change rapidly. Even if experts face a favorable political context (e.g. democratic control of the state legislature and governorship), societal pressures might still undermine their legitimacy and slow down the implementation of certain measures.

In other words, even if the allies of scientific expertise (in a general sense) hold power, this does not necessarily lead to evidence-based policymaking (as in policy guided by scientific expertise). This must not necessarily be interpreted as scientific expertise being inherently political. Rather, it shows how rapidly scientific expertise tends to become politicized, even in situations marked by a high degree of uncertainty. Of course, if one eschews the possibility that reliance on scientific expertise might enable political decision makers, at times, to distinguish between "good" and "bad" policy, if there is no such thing as a "best-evidenced policy solution", then our findings might be simply brushed aside. That a decrease in the scientific experts' status hampers the success of their recommendations might simply be considered a "return to normalcy", in which scientific expertise is always weighed up against the preferences of interest groups, political parties, and voters. Scientists should "stop bemoaning the real world and adapt to it" (Cairney, 2016, p. 120).[14]

On the other hand, if we contend that certain decisions should be, at least to some extent, insulated from normal politics (Newman, 2017), then the rapid decline in expert recommendations' chances of success might be considered problematic. Dunlop (2014) argued that experts' status or "certification" represented a key variable in understanding how political decision makers use scientific expertise. Under conditions of epistemic uncertainty, authoritative experts inform decision-makers' preferences, they act as "socially legitimate teachers to decision makers" (Dunlop, 2014, p. 213). This is when evidence-based policymaking is most likely to take place. However, our study suggests that experts can lose this role very rapidly and that this indeed affects the implementation of their recommendations. Within only a few months and during the same health epidemic (and when no vaccine was yet developed), we observed a

considerable decrease in the government's propensity to implement the scientists' recommendations. The opportunity for evidence-based policymaking thus appears to have quickly vanished. This raises the question as to how experts' status can be "protected"; how the relationship between experts' status and the success of their recommendations can be rendered less "elastic" while avoiding the pitfalls of technocracy (Bertsou & Caramani, 2020).

At least two caveats need to be considered. First, we contend that experts' status affects the implementation (speed) of their recommendations. While we suggest that experts' status might, therefore, also affect the timing of certain measures (e.g. school closures), testing this proposition more thoroughly would require a comparison across jurisdictions. Were jurisdictions in which experts were closely associated to the crisis management organization quicker to react? This would allow controlling for the competing influence of institutional structures, legal provisions for advisory systems, policy legacy, party politics and public opinion on the implementation of expert advice (e.g. Hadorn et al., 2022; Salajan et al., 2020; Toshkov et al., 2022; Warner & Zhang, 2021). In a further step, our data could be connected to the Oxford COVID-19 Government Response Tracker (Hale et al., 2021). It includes 19 policy indicators covering closure and containment as well as health and economic policies. It could be tested whether the timing and stringency of these policy measures depends on expert recommendations. The ultimate challenge will be to achieve meaningful benchmarks for government policy responses and their performance on health, economic and social outcomes and the role experts have played in achieving policy success (George et al., 2020).

Second, future research should explore alternative explanations for the observed moderation of the effect of problem pressure between the first and second phase of the pandemic. On the one hand, the weaker effect of problem pressure during the second phase could also reflect a certain change in attitude on behalf of the STF itself. Perhaps, anticipating a challenge to its authority during the second phase, it made more "extreme" recommendations and hoped that these would be met at least partially. If this "strategy" backfired, then this could have contributed to the lower implementation rate during the second phase. On the other hand, the comparatively successful management of the first wave, when the implementation rate of STF recommendations was high and infections were brought down rapidly, might have increased governmental authorities' belief that the problem could be managed. This may have made them less receptive to the arguments put forth by the scientists within the STF. Dunlop (2014, pp. 209–14) indeed argued that politicians make only "symbolic use" of knowledge when the perceived problem tractability becomes higher, and simultaneously, when the scientific experts' status becomes lower. The policy process is open to a plurality of "knowers" (e.g. party leaders, representatives of organized interests and subnational authorities) who deliver their pieces of evidence and formulate policy recommendations. Decision makers selectively follow some of this advice to justify their own policy preferences: "policies are the result of partisan mutual adjustment with evidence used to drive home bargains" (Dunlop, 2014, p. 214). In other words, scientific experts are no longer teaching political decision makers what they must do. On the contrary, politicians select experts' advice to back the policy compromises they have negotiated with the dominant policy stakeholders. Upcoming studies must hence investigate how problem tractability, as perceived by politicians, varies over time.

The results of our multiple regressions indicated that the propensity of the Federal Council to implement STF recommendations varies over time. As such, policy scholars should give more attention to the rapid and important changes in knowledge use that can occur within the same policy domain and institutional context in an emergency, such as infectious disease outbreaks, economic crises, or energy shortages. Like Dunlop and Radaelli (2020, p. 184), we invite comparative policy scholars to value the granularity of policy processes when studying the conditions under which policymakers listen to scientific experts.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in the Yareta depository of the University of Geneva at doi:10.26037/yareta:c3xsbjcrkjb7rh7l7q6ixxde3e.

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ENDNOTES

[1] In French: État-major du Conseil fédéral chargé de gérer la crise du coronavirus (EMCC).

[2] The data that support the findings of this study are openly available in the Yareta depository of the University of Geneva at https://doi.org/10.26037/yareta:c3xsbjcrkjb7rh7l7q6ixxde3e (Eichenberger et al., 2022).

[3] The first phase of management (March 16–June 19, 2020) coincides with the first COVID-19 wave, whereas the second phase (June 20, 2020 onwards) comprises the second and third waves.

[4] The policy briefs are available at: https://sciencetaskforce.ch/fr/policy-briefs-francais/ (accessed on July 12, 2021).

[5] We relied on the press releases issued by the FC to identify the measures it had taken. Reliance on official legal documents rather than press releases would have required comparing the revised legal documents to the previous versions to identify and decipher the measures taken. While not impossible, this was beyond our means. The 179 press releases alone required us to analyze 568 pages of text.

[6] The press releases are available at: https://www.admin.ch/gov/fr/accueil/documentation/communiques/communiques-conseil-federal.html (accessed on July 12, 2021). We used the following search terms (in French): coronavirus, covid, pandémie.

[7] Inversely, we could also assess the extent to which STF recommendations supported FC decisions. Over the entire period examined here, we could link 14% (roughly one in seven) of the 739 measures taken by the FC to an STF recommendation.

[8] Epidemiological data were drawn from the FOPH website, which provides the figures on the coronavirus situation in Switzerland: https://www.bag.admin.ch/bag/en/home/krankheiten/ausbrueche-epidemien-pandemien/aktuelle-ausbrueche-epidemien/novel-cov/situation-schweiz-und-international.html#-1680104524 (accessed on September 1, 2022).

[9] In German: Krisenstab des Bundesrates Corona (KSBC), in French: État-major du Conseil fédéral chargé de gérer la crise du coronavirus (EMCC).

[10] For the *Tages-Anzeiger*, we used the following search term in the swissdox database: ("taskforce kritisiert" ~ 100 OR "taskforce kritik" ~ 100) AND (corona OR covid). It looks for all articles mentioning the term "taskforce" in combination with either "kritisiert" (German for "criticized") or "kritik" (German for "criticism"). The term "taskforce" must be found within 100 words of either "kritisiert" or "kritik". This first term must be found within an article mentioning either "corona" or "covid". The same term was used for the NZZ, except "taskforce" was replaced by "task force". Note that the search engine is not case sensitive. For *Le Temps*, we used the following search term: ("task force critique" ~ 100 OR "task force déplore" ~ 100) AND (corona OR covid).

[11] These were: Clinical Care; Data and Modeling; Diagnostics and Testing; Digital Epidemiology; Economics; Ethics, Legal, and Social; Exchange Platform; Immunology; Infection Prevention and Control; Public Health.

[12] We organized four rounds of intercoder agreement tests between the two coders before the coding process. Krippendorff's alpha score was 0.86 (30 measures per test).

[13] During the second phase, problem pressure exerts a very small (0.002) and statistically insignificant effect ($p > 0.10$) effect.

[14] Cairney (2016, p. 119 emphases in the original), who argued that "if you want to inject more science *into* policymaking, you need to know the science *of* policymaking", would probably be happy to see that one frustrated member of the STF decided to read the *Handbook of Swiss Politics* during his 2020 Christmas vacation (Plattner & Odehnal, 2021).

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APPENDIX

TABLE A1 Example of recommendations and their implementation.

STF recommendation (date)	FC measure (date)	Implementation
"We recommend the following measures until March/April 2021: At the national level, […] telework for all professionals who are able to do so" (October 16, 2020)	"Employers should also allow their employees to telework as much as possible and ensure their safety at work" (October 28, 2020)	Full
"We suggest taking additional measures (e.g. temporary closure of bars, restaurants and non-essential shops)" (November 6, 2020)	"Restaurants and bars must remain closed between 7 pm and 6 am and may remain open on Sundays and public holidays" (December 11, 2020)	Partial
"In order (a) to further strengthen the resilience of the Swiss economy during the pandemic, and (b) to unblock the current deadlock between tenant and landlord lobbies, public matching payments on rent abatements for commercial tenants offer an economically attractive solution" (May 1, 2020)		No

TABLE A2 Example of (financial) measures and subsidies recommended by the STF.

Measure	Description	Example	Policy domain
Non-economic	(Conditional) authorization, obligation	"Health care personnel belonging to high risk groups should stay at home" (April 11, 2020)	Labor & Employment
Economic	Payment reduction/deferral	"The credit-issuing bank must maintain its already existing, unsecured exposure to the borrowing company in full until a given date" (August 31, 2020)	Economic activities
	(Non-repayable) grants	"If it turns out that the costs of face masks are a hurdle that prevent part of the population from using them, then subsidizing face masks could be considered" (June 4, 2020)	Health

TABLE A3 Logistic regressions explaining the implementation (full or partial, full) of STF recommendations.

	Full or partial		Full	
	Model 1	Model 2	Model 3	Model 4
(Intercept)	1.15***	0.84*	0.10	−0.40
	(0.41)	(0.43)	(0.39)	(0.45)
Problem pressure	0.01**	0.03**	0.00	0.04***
	(0.00)	(0.01)	(0.00)	(0.01)
STF status low (ref: high)	−1.04***	−0.55	−0.64*	0.13
	(0.37)	(0.45)	(0.38)	(0.48)
Economics & social experts (ref: other)	−0.72*	−0.87**	−0.24	−0.44
	(0.37)	(0.39)	(0.38)	(0.40)
Economic measures (ref: non-economic)	−0.75	−0.54	−0.43	−0.11
	(0.46)	(0.47)	(0.49)	(0.50)
Solicited (ref: unsolicited)	−0.47	−0.65*	−0.58	−0.90**
	(0.35)	(0.36)	(0.35)	(0.38)
Problem pressure × STF status		−0.03*		−0.04***
		(0.01)		(0.01)

TABLE A3 (Continued)

	Full or partial		Full	
	Model 1	**Model 2**	**Model 3**	**Model 4**
AIC	246.31	244.44	247.53	240.86
BIC	265.67	267.02	266.88	263.44
Log likelihood	−117.16	−115.22	−117.76	−113.43
Deviance	234.31	230.44	235.53	226.86
Num. of obs.	186	186	186	186

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

TABLE A4 Multinomial logistic regression explaining the implementation of STF recommendations.

	Model 1
Partial impl.: (Intercept)	−0.05
	(0.56)
Partial impl.: Problem pressure	0.01
	(0.02)
Partial impl.: STF status low (ref: high)	−1.00*
	(0.58)
Partial impl.: Economics & social experts (ref: other)	−0.98*
	(0.52)
Partial impl.: Economic measures (ref: non-economic)	−0.95
	(0.73)
Partial impl.: Solicited (ref: unsolicited)	−0.21
	(0.48)
Partial impl.: Problem pressure × STF status	−0.01
	(0.02)
Full impl.: (Intercept)	0.24
	(0.49)
Full impl.: Problem pressure	0.04***
	(0.02)
Full impl.: STF status low (ref: high)	−0.22
	(0.52)
Full impl.: Economics & social experts (ref: other)	−0.78*
	(0.43)
Full impl.: Economic measures (ref: non-economic)	−0.33
	(0.53)
Full impl.: Solicited (ref: unsolicited)	−0.94**
	(0.41)
Full impl.: Problem pressure × STF status	−0.04***
	(0.02)
AIC	389.69
BIC	434.85
Log likelihood	−180.85
Deviance	361.69
Num. of obs.	186
K	3

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

TABLE A5 Ordered logistic regression explaining the implementation of STF recommendations, with log-transformed problem pressure (hospitalizations/day).

	Model 1	Model 2
Problem pressure (log)	0.291***	0.619***
	(0.112)	(0.188)
STF status low (ref: high)	−1.010***	0.481
	(0.348)	(0.748)
Economics & social experts (ref: other)	−0.602*	−0.730**
	(0.351)	(0.363)
Economic measures (ref: non-economic)	−0.497	−0.339
	(0.456)	(0.464)
Solicited (ref: unsolicited)	−0.517	−0.829**
	(0.317)	(0.350)
No impl. | Partial impl.	−0.497	0.001
	(0.462)	(0.520)
Partial impl. | Full impl.	0.438	0.957*
	(0.462)	(0.524)
Problem pressure (log) × STF status		−0.558**
		(0.250)
AIC	388.378	385.282
BIC	410.958	411.088
Log likelihood	−187.189	−184.641
Deviance	374.378	369.282
Num. of obs.	186	186

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