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Playing Second Fiddle. Expert Advice and Decision-making in Switzerland

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Faculté des sciences sociales et politiques
Institut d'études politiques et internationales

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Thèse de doctorat

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pour l'obtention du grade de

Docteur ès science politique

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- Frédéric VARONE, Professeur à l'Université de Genève

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«Playing Second Fiddle : Expert Advice and Decision-Making in Switzerland.»

Lausanne, le 5 mai 2014

Le Doyen de la Faculté

Professeur
Fabien Ohl

Résumé

Cette thèse de doctorat porte sur le rôle de l'expertise scientifique dans le processus décisionnel au niveau fédéral en Suisse. Elle tente de comprendre comment des facteurs liés aux institutions politiques ainsi qu'aux dynamiques politiques engendrées par des enjeux politiques particuliers influencent la distribution d'accès à l'expertise scientifique, sa valorisation par des acteurs politiques comme ressource stratégique, et les effets qu'engendre sa mobilisation sur le processus décisionnel. La thèse développe un cadre théorique qui postule que la distribution de l'accès à l'expertise scientifique et sa disponibilité dépendent de l'allocation de ressources financières et organisationnelles dans le système politique. Ceux qui en disposent vont évaluer l'utilité de l'expertise scientifique par rapport à leurs intérêts et à la lumière de la structure des conflits qu'ils anticipent comme dominante dans l'arène politique. Les résultats empiriques montrent que la configuration institutionnelle du système politique produit une forte concentration, dans les mains de l'administration fédérale, des ressources nécessaires pour mobiliser l'expertise scientifique. Le parlement, les partis politiques ainsi que d'autres acteurs de la société civile ne disposent que de peu de moyens à cette fin. De plus, les producteurs traditionnels d'expertise scientifique issues du système de milice (p.ex. les commissions extra-parlementaires ou les académies scientifiques) ne disposent pas d'un accès au pouvoir politique autre que celui dont disposent aussi les groupes d'intérêt. Ces producteurs sont de plus en plus substitués par des homologues professionnalisés qui offrent leurs services à l'administration fédérale sous forme de prestation. Par contre, d'autres changements comme la polarisation partisane croissante dans le système politique ainsi que la diminution de l'inclusion des groupes d'intérêts dans la phase pré-parlementaire ne semblent pas contribuer à une politisation croissante de l'expertise scientifique. Finalement, la structure d'un problème politique exerce une influence à la fois sur la décision de mobiliser l'expertise scientifique et sur les effets de cette dernière, car elle conditionne la structure d'un conflit ainsi que son anticipation. Des problèmes structurés engendrent une superposition des acteurs contrôlant la mobilisation d'expertise avec ceux qui en constituent l'audience. Ceci augmente la chance que l'expertise puisse contribuer au contenu d'une politique. Par contre, cette influence diminue en présence d'un problème peu structuré et marqué par des conflits de valeur.

Abstract

This thesis concerns the role of scientific expertise in the decision-making process at the Swiss federal level of government. It aims to understand how institutional and issue-specific factors influence three things: the distribution of access to scientific expertise, its valuation by participants in policy formulation, and the consequence(s) its mobilization has on policy politics and design. The theoretical framework developed builds on the assumption that scientific expertise is a strategic resource. In order to effectively mobilize this resource, actors require financial and organizational resources, as well as the conviction that it can advance their instrumental interests within a particular action situation. Institutions of the political system allocate these financial and organizational resources, influence the supply of scientific expertise, and help shape the venue of its deployment. Issue structures, in turn, condition both interaction configurations and the way in which these are anticipated by actors. This affects the perceived utility of expertise mobilization, mediating its consequences. The findings of this study show that the ability to access and control scientific expertise is strongly concentrated in the hands of the federal administration. Civil society actors have weak capacities to mobilize it, and the autonomy of institutionalized advisory bodies is limited. Moreover, the production of scientific expertise is undergoing a process of professionalization which strengthens the position of the federal administration as the (main) mandating agent. Despite increased political polarization and less inclusive decision-making, scientific expertise remains anchored in the policy subsystem, rather than being used to legitimate policy through appeals to the wider population. Finally, the structure of a policy problem matters both for expertise mobilization and for the latter's impact on the policy process, because it conditions conflict structures and their anticipation. Structured problems result in a greater overlap between the principal of expertise mobilization and its intended audience, thereby increasing the chance that expertise shapes policy design. Conversely, less structured problems, especially those that involve conflicts about values and goals, reduce the impact of expertise.

To Sarah ... for not letting assumptions go unquestioned

Acknowledgements

The support of other people, rather than unlimited time, curiosity, and (finally) the exhaustion of false leads to explore, has enabled me to complete this dissertation. Such support has come in different forms and from various directions. I am deeply indebted to the many policy professionals and members of the Swiss policy elite who agreed to be interviewed for this research, but who cannot be named here to protect their anonymity. Interviewing them did much more than provide data that this research relies on; encountering them in person, and listening to their testimony, enabled me to develop some real-life comprehension of the social worlds of politics and scientific expertise, which I had previously known only from secondary accounts. Data collection also substantially benefited from the assistance of the Federal Office for the Environment's climate division, which let me access and digitize its internal archive, and from Karin Ingold's many helpful insights concerning key actors in Swiss climate policy.

Most of this dissertation research took place while I was employed as a teaching assistant at the University of Lausanne's *Institut d'études politiques et internationales*. In addition, grants by the Swiss National Science Foundation enabled me to participate in research methods training courses (grants 10SO11-121672/1; 10SO11-117539/1), and to spend the 2011/2012 academic year as a visiting researcher at the Consortium for Science, Policy, and Outcomes (CSPO) at Arizona State University (grant PBLAP1-136791). CSPO provided an intellectually stimulating environment, and the many conversations I had with academics, doctoral students, and other visiting researchers has contributed substantially to the expansion of my thinking on science and society relations. Amongst the many people who enabled this stay, I want especially to thank CSPO co-director David Guston, who not only extended the original invitation, but also agreed to serve as an examiner on the jury. The last year of dissertation work took me to Denmark, where Cecilie Glerup kept me loyal company in the library during all the ups and downs of the final writing period.

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I owe the biggest debt to my family, especially my parents Sibylle and Christoph Himmelsbach, and to my partner Sarah Davies, without whose emotional, material, and intellectual support I would not have managed to bring this endeavor to a close. Embarking on such a project would not have been possible if not for my parents' encouragement and unconditional support throughout my education. Sarah repeatedly read the entire manuscript, not only checking for style and grammar, but also helping to eliminate fuzziness and redundancy by suggesting many help-

ful cuts. Her biggest contribution has been her continued insistence that plans are there to be followed, not just to be made.

All these people enabled me to complete this project, but as the author any mistakes and misrepresentations this thesis may contain are, of course, my responsibility.

Copenhagen, May 2014

Raffael Himmelsbach

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List of Abbreviations

ACF	Advocacy Coalition Framework
ACI	Actor-centered Institutionalism
CCFD	Conference of the Cantonal Finance Directors
CCG	Conference of Cantonal Governments
CESET	(Parliamentary) Commission on Environment, Spatial Planning, Energy, and Transportation
CO_2	Carbon dioxide
COP	Conference of the Parties
CSEC	(Parliamentary) Commission on Science, Education, and Culture
CVP	Christlichdemokratische Volkspartei der Schweiz [Christian Democratic People's Party]
DI	Discursive Institutionalism
EC	European Commission
ELSI	Ethical, Legal, and Social Implications
FAMAR	Federal Act on Medically Assisted Reproduction
FARHB	Federal Act on Research involving Human Beings
FDHA	Federal Department of Home Affairs
FDP	Freisinnig-Demokratische Partei [Radical Party]
FFA	Federal Fiscal Administration
FOE	Federal Office of Energy
FOEEA	Federal Office for External Economic Affairs
FOEN	Federal Office for the Environment
FOJ	Federal Office of Justice
FOPH	Federal Office of Public Health
GEK	Gesamtenergiekonzeption [Energy policy master plan]
GIESC	Groupe interdépartemental d'étude sur le changement climatique [Interagency study group on climate change]
GMO	Genetically modified organisms
hESC	Human Embryonic Stem Cells
IDAGEN	Interdepartementale Arbeitsgruppe Gentechnologie [Interagency working group on gene technology]
IPCC	Intergovernmental Panel on Climate Change
iPSC	Induced pluripotent stem cells
IIP	Institute of Intellectual Property
IVF	In vitro fertilization
KU	Knowledge utilization
MP	Member of Parliament
NACBE	National Advisory Commission on Biomedical Ethics
NCCR	National Competence Center in Research
NFE	New Fiscal Equalization
NO_x	Nitrous oxide
NRP	National Research Program
NZZ	Neue Zürcher Zeitung
OcCC	Organ consultatif sur le changement climatique [Advisory body on climate change]

PCA	Parliamentary Control of the Administration
PGA	Problem Governance Approach
SAAS	Swiss Academies of Arts and Science
SAES	Swiss Academy of Engineering Sciences
SAHSS	Swiss Academy for Human and Social Sciences
SAMS	Swiss Academy for Medical Sciences
SANS	Swiss Academy of (Natural) Science
SERI	State Secretariat for Education, Research and Innovation
SNSF	Swiss National Science Foundation
SPS	Sozialdemokratische Partei Schweiz [Swiss Social Democratic Party]
SSTC	Swiss Science and Technology Council
SVP	Schweizerische Volkspartei [Swiss People's Party]
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value added tax
WMO	World Meteorological Organization
WTO	World Trade Organization
WWII	World War II

One

Introduction

> … The [political] debate about the prolongation of the [GMO] moratorium mainly centered on famers' and consumers' alleged non-acceptance of genetically modified crops, and the evidence-based research findings from the national research program "Benefits and Risks [of GMO]" were completely neglected. … The Swiss Academies of Arts and Sciences expect Parliament to deliberate on how to deal with GMOs based on the national research program's findings. Switzerland should not incrementally ban GMO and novel breeding technologies just because of transient economic interests. Seldom is it wise to limit future options because of short-term economic interests. …
>
> Extract from an open letter the Swiss Adademices of Arts and Sciences sent to Parliament (Courvoisier et al., 2013). My translation.

1.1 Introduction

From environmental governance to social policy, many contemporary public policy problems rely heavily on expert evidence, as provided by academic advisers, for their resolution. A comprehensive literature on advisory processes has thus come into being, motivated by the perception that the advice that is proffered is inadequately taken up by policy-makers, and driven by concerns about the potential for democratic values to be undermined by technocratic decision-making.

This thesis investigates the causes and consequences of such mobilization of scientific expertise within policy formulation processes. It contends that both the nature of the advisory system and the structure of policy problems influence the mobi-

lization of scientific expertise and its influence on policy politics and design. Empirically, the thesis looks at scientific expertise and policy formulation within the Swiss political system. By analyzing the organization of science advice and studying how it is deployed in three policy formulation processes, the study demonstrates how institutional factors and issue-specific elements account for the who, where and when of the mobilization of scientific expertise. It also explores what influence this has on the policy process.

The reminder of this introduction further establishes the object of this study, introduces the site of inquiry, and explains the approach. It concludes with a definition of scientific expertise and a synopsis of the chapters that follow.

1.2 Aims of the inquiry

Science has occupied a prominent place in political life since early modernity (Ezrahi, 1990; Latour, 1993; Shapin and Schaffer, 1985). This prominence has increased significantly during the 20^{th} century, as the state expanded its reach into ever more domains of society (Weingart, 2001). Today, science and the expertise it produces are indispensable for governance in many policy domains, be it through the academic training of civil servants or through the formulation of policy advice.

This prominence has not come without scrutiny. It was during the 1970s that sociological research on the role of science in policy and society began in earnest. The historical context to this research was provided by unprecedented levels of government demand and support for initiatives to draw on the fruit of scientific inquiry in order to support public action. The expansion of the welfare state, in particular, contributed to an ever increasing 'scientificization' of politics (Weingart, 2001). Yet despite the scale of scientific involvement in public action, there was widespread disappointment about its outcomes, which fell short of expectations. Social scientists from a wide range of backgrounds therefore embarked on a research program which aspired to fashion a 'sociology of knowledge application' (Holzner and Fischer, 1979), known today as the knowledge utilization literature. The biggest insight from research within this framework is that there is seldom a direct pathway between expertise and policy. Instead, research has demonstrated

time and time again that scientific recommendations cannot eschew politics in their quest to inform policy, as politics more often entails contentious interaction than engineering-like decision-making. The biggest challenge to furthering our understanding of these processes is to construe scientific expertise not as an act of information processing by an individual, but as a process of social interaction. This is the indispensable key for beginning to understand the role of scientific expertise in the political arena and its outcomes on policy politics and design.

It was not only the perceived influence shortfall of scientific research on matters of policy that drew researchers to study science in the context of politics. Modernity is intrinsically interwoven with scientific and technological progress, but this progress is also the origin of many contemporary problems, such as the environmental crisis. Both Rachel Carson's (1962) *Silent Spring*, which denounced the effects of pesticides, and the anti-nuclear movement were landmarks in raising public awareness of the environmental risks produced by technology. The ensuing age of 'reflexive modernization', in which public attention is turned to the very foundation of what makes contemporary society possible (Beck, 1992), also created new demands for scientific expertise in order to adjudicate the risks of technologies such as nuclear energy, genetically modified organisms, and fossil fuel based energy sources. As scientific controversies erupted in public, academics such as Dorothy Nelkin begun to study them (e.g. Nelkin, 1975). This and subsequent research (e.g. Jasanoff, 1990; Wynne, 1996) has demonstrated that science is not (and probably cannot be) a politically neutral party in controversies around technical and environmental risks. As this work has argued, the distinction between matters of 'fact' and matters of 'value' is not given, but rather negotiated through boundary work (cf. section 2.3). It follows that the production and propagation of scientific expertise are thoroughly *political* processes, which cannot be understood in isolation from political problem solving.

Building on the twin insight that scientific expertise is a political phenomenon both because of its process and its engagement with inherently value-laden issues, this thesis aims to further understanding of its role in the policy arena. More specifically, this study seeks to enhance our insight into the relations between science and politics by construing the relationship between scientific expertise and politi-

cal problem solving in terms of two-way causality. Addressing this issue therefore requires pursuing two distinct, yet related, analytical goals. The first goal is to investigate when and why scientific expertise becomes part of policy deliberation. This implies examining the (possible) influence of a political system's institutions, the access of different groups to such expertise, and the nature of a specific policy issue. The second goal builds on observations of particular instances of the use of scientific expertise to ask if, and how, such expertise influences not only cognitive but also social aspects of the policy process that brought it into being. Past research has tended to construe expertise as an exclusively cognitive object, with cognitive consequences (impact on policy proposal or policy learning), and has thereby neglected the social dimensions that are very much present in the policy process. This research remedies this omission.

For empirical purposes, this double objective translates into three distinct questions:

1. In a given policy formulation process, what instances of scientific expertise can be observed, and in which sites do they take place?
2. Who initiates a particular process of scientific expertise, and what are the rationales for doing so?
3. What cognitive and social effects does an instance of scientific expertise engender in the policy formulation process?

The relevance of this inquiry comes from concerns about efficiency, democracy, and social theory, constituting three key rationales. The efficiency argument relates to the processes by which expertise is crafted, deployed and received. There is a widespread sense in the wider public and scientific community alike that there is a persistent gap between what we know as a society as a result of scientific inquiry, and how we choose to act collectively through policy. This uneasiness disaggregates into worries about the quality of expertise, the performance and accountability of those institutions that dispense policy advice, and the opportunistic (ab)use made of science in politics. Many ordinary citizens and scientists are familiar with instances where scientific expertise has failed, was discredited by interest groups, or was shunned by opportunistic policymakers for speaking up against powerful interests. The scientific community (e.g. Sutherland et al., 2012), in particular, hopes

that the gap between collective knowledge and action can be narrowed through better understanding of how scientific expertise informs policy.

Academic interest in scientific expertise is warranted for democracy's sake because scientific expertise shapes issues of great consequence for society although scientific advisers are neither elected, nor operate under the direct control of elected officials (as the core bureaucracy does). Scientific experts are also the dominant participants in highly technical and complex policy areas. But since policy issues are never devoid of value considerations, even technical and complex ones, an exclusively technical issue does not exist. It is beyond debate that scientific experts are of crucial importance and that their presence is desirable in many policy domains. However, some argue that there is a risk that scientific experts monopolize certain issues, crowding out other voices worthy of attention (e.g. Fischer, 2000; Parthasarathy, 2010; Wynne, 1996). This risk increases with the trend that an increasing number of important decisions are being taken in arenas not accountable to elected representatives (Papadopoulos, 2010). Therefore, learning about how social processes around scientific expertise in policy work, and what consequences they engender for policy and politics, is in the interest of making such processes transparent and accountable.

There is also a strong case for studying scientific expertise for social theory's sake. In sociological terms, scientific expertise is a hybrid activity, taking place between the social domains of science and politics, each of which have their own independent functional logics (Kusche, 2008), but which are mutually co-constitutive and depend on each other in multiple ways (Jasanoff, 2004). Because scientific expertise as a social process operates in an environment of multiple and overlapping social norms, its agents require special coping skills in order to reconcile these demands. Moreover, given that science and politics operate in very different 'timescapes' (Brown, 2009: 194), demands for flexibility constitute a limit to institutionalization. Social processes that take place in this kind of complex social ecology constitute interesting case studies of fundamental social phenomena such as trust-building and the shaping of collective representations of the world. As chapter 2 demonstrates, the existing literature contains important gaps. It focuses primarily on micro-social processes and eschews the analysis of scientific expertise within

the broader context of political institutions. For instance, there is a great deal of evidence concerning the attitudes and (self-reported) behaviors of individuals engaged in policy formulation and decision-making with regard to scientific expertise. Moreover, there are many case studies of the production and negotiation of scientific expertise within a particular advisory forum. But, thus far, there are surprisingly few studies that attempt to understand scientific expertise in relationship to the policy process itself.

1.3 Sites of inquiry

As the study title suggests, this research largely focuses on Switzerland. It analyzes the way in which institutional factors and issue-specific political dynamics establish contexts that bestow authority on scientific expertise within the policy process. There is value in and of itself in exploring the institutional and cultural idiosyncrasies of a particular country, especially since authoritative scholarship on scientific expertise in Switzerland has been missing since the early 1980s (but see Frey, 2010a).

Moreover, Switzerland is often referred to – and self-identifies as – a *Sonderfall*, or special case. This designated specialness pertains to the country's *political* institutions: (grassroots initiated) direct democratic procedures in parallel with representative institutions, federalism, and a collegial executive elected by but otherwise independent of Parliament. Together those institutions produce a decision-making process that is inclusive with regard to policy formulation, because a governmental decision can always be challenged on the ballot. At the same time, the Swiss people regularly vote on issues and consequently have to formulate opinions on what can be highly complex issues. Does this render Switzerland also a special case with regard to its system and culture of scientific expertise? This study makes a clear statement about the nature of the Swiss advisory system by arguing that expertise plays 'second fiddle' in Swiss politics. However, this does not constitute an answer to the special case question because we simply know too little about similarities and differences between countries. Jasanoff has argued that how societies collectively know is the product of historically contingent cultural practices, expressed through

nation-specific 'civic epistemologies' (Jasanoff, 2005a). These constructs are complex enough that each country seems to warrant a special case status. Research on scientific expertise in a comparative fashion, young as it is, has no institution-based typologies to offer akin to the comparativist's treasured ideal types of consensus, respectively Westminster-style democracy (Lijphart, 1999). For instance, Switzerland and the Netherlands both fall into the consensus democracy spectrum, but the organization of scientific expertise supply couldn't be more different. The Netherlands sports four public advisory bodies, each of which has an extraordinarily powerful position in the political system (Halffman, 2009). In Switzerland the supply of expertise is fragmented, and advisory bodies need to build networks in order to secure access to their target public, rather than being given such access through institutional rules (cf. chapter 5). Comparing Switzerland to Germany and Britain offers yet another illustrative example. While Switzerland and Germany face rather similar degrees of power diffusion in the political system, Switzerland is much closer to Britain in that the foundation for trust in experts tends to be based on personal connections rather than on formal academic affiliation (cf. Jasanoff 2005a; chapter 5 this study).

These exemplars make the point that we currently lack the conceptual tools, as well as robust findings from cross-country comparative research, that would allow us to determine whether each national system of scientific expertise constitutes a distinct type of its own or whether several cases share similar traits. Thus, choosing to study scientific expertise in the Swiss political system is not grounded in any pretensions to emulate a quasi-experimental research design, which would require clear assumptions about similarities and differences to other cases. Rather, Switzerland is *one* case (amongst other possible candidates) which serves a purpose in an enterprise of theory *development*. Thinking in comparative terms, then, serves two functions: by reflecting the Swiss experience against the backdrop of other countries it becomes possible to develop a reflexive distance toward the empirical context under study; and, crucially, it informs reflections on the boundaries of generalization of the empirical findings this study produces.

The comparison of institutional and cultural components of a national system of scientific expertise sharpens the gaze on the Swiss context. However, this research

ultimately revolves around a comparison of a different kind. Ever since Theodor Lowi (1964, 1972) hypothesized that the substantive nature of a policy influences the politics of policymaking, this has been a question of interest for students of public policy. While there are several theoretical propositions about how this might apply to scientific expertise (Boswell, 2009; Braun, 1998; Topf, 1993), empirical validation is still lacking. Building on a policy issue typology developed by Hoppe (2010), this study compares three policy formulation processes that differ regarding the degree of structure in terms of the respective presence or absence of conflicts about values and about the relevant knowledge at stake.

The first case involves the debate around research with human embryonic stem cells, which engendered a sustained epistemic and value controversy. Stem cell derivation is a fatal procedure for the approximately five day old donor embryo. The issue came onto the political agenda when the Swiss National Science Foundation agreed to fund stem cell research, amid protests about a lack of public consultation and an ambiguous legal framework. The issue opposed the interests of cell biologists, on one side, with those of a coalition protesting the instrumentalization of human life. None of these groups participated in drafting the law, which was accomplished in just a few months. While not having participated in policy formulation, an external legal expert and advisory bodies from technology assessment and biomedical ethics established themselves as independent voices, particularly during the period that the case was deliberated in Parliament.

The second case explores the start and stop effort to introduce a tax on carbon dioxide emissions. This took place during the 1990s and represents a semi-structured case, with little disagreement about climate change knowledge, but much debate about the prioritization of goals. Gridlocked between the government's plans to raise revenue for infrastructure projects through energy taxation, and the imperative of not disadvantaging energy-intensive industries by burdening them with a tax, this policy underwent substantial reframing and modification of its design before it was ultimately adopted under the shadow of the Kyoto protocol. Scientific expertise was mainly drawn upon to model the energy system and the effectiveness and efficiency of the tax. Climate science was virtually absent from policy deliberation, even as the Swiss climate science community started to organize.

The final case is the reform of the fiscal equalization scheme between the federal government and member states (cantons). It is characterized by strong consensus on reform goals, while unearthing several epistemic uncertainties. Dating from 1959, the old transfer scheme aimed to decrease the material disparities among cantons through an increasingly complex system of subsidies and allocations. Economic theories of fiscal federalism substantially informed the policy design process, which was conducted through an elaborate participatory scheme and lasted about a decade. The reform project engendered a mandatory ballot vote, as it amended multiple constitutional provisions.

The focus on policy *formulation* as the context in which to study scientific expertise, rather than agenda setting or policy implementation, is a deliberate one, based on this context being the most contingent environment for scientific expertise. As Campbell Keller (2009) has convincingly shown for US clean air and climate policy (and as is also argued by Hoppe et al., 2013), scientists engage differently with policy issues depending on the stage of the policy cycle. As the process moves from agenda setting to policy formulation and ultimately to policy implementation, scientists are confronted with an increasingly structured context. Their style of policy engagement consequently changes from issue advocacy to portraying themselves as pure scientists who 'just present the facts'.

1.4 A situated perspective

The meaning of a situated perspective is that social action has to be explained by understanding the meaning actors attribute to events and choices within the phenomenon's context. This is nicely captured by the dictum that 'situations defined as real are real in their consequences' (Clarke, 2005: 7). The symmetry principle proposed by the strong program in the sociology of scientific knowledge (cf. Bloor, 1976), takes this up when it decrees that the analyst must treat all knowledge claims as equal. For the analyst, then, there are no analytical categories of scientific vs. pseudo scientific claims, because he or she is interested in how social actors negotiate epistemic credibility and construct such categories of knowledge. For the study of scientific expertise this means that the analyst should refrain from declaring one

way of using scientific evidence as more legitimate than others. Moreover, great care is necessary to avoid the hindsight fallacy. While the analyst examining a reconstructive case study is at a vantage point of knowing the end to a story, actors in a process are not; what might be a clear outcome for the analyst can only ever remain a contingent one *in situ*.

A situated perspective does not preclude the formulation of theoretical expectations. Claims to pure induction would not only misrepresent the research process, observation without preconception is simply impossible. However, it demands that the instruments of observation capture as much as possible the meaning actors attribute to a particular situation, rather than to assess their actions based on a rigid conceptual template imposed by the analyst (Clarke, 2005). This demands that situations in which actors make choices about things like scientific expertise are reconstructed in order to identify what elements of a situation matter to its participants.

1.5 A working definition of scientific expertise

Having presented the research object, this study requires an operational definition of scientific expertise before proceeding any further. The first element of this definition is that this study's interest is in expertise relating to the substantive problem of a policy issue. This therefore excludes expertise and advice about policy-making strategy on which policymakers may draw.

The second element of this definition states that scientific expertise draws on systematic inquiry, rather than on individual experience. It is without any doubt that experience-based expertise gained from professional practice is a very important resource for political problem solving. Some even argue that it is the most important source of political knowledge (e.g. Lindblom and Cohen, 1979).[1] Nevertheless, this study's insistence on expertise grounded in systematic inquiry derives from the social mechanisms involved in its production and in its epistemic authority, which are qualitatively different from other sources of political knowledge.

This focus on expertise grounded in systematic inquiry entails yet another clarification. The policy process has long been home to the production of its own sys-

[1] See also the contributions in Irwin (1996) and Leach and Scoones (2005).

tematic knowledge in form of policy appraisal. Evaluations of the outcomes of policy measures are the best known form of appraisal. Regulatory impact assessment (RIA), also called *ex ante* appraisal, is the younger cousin of evaluation and aims at qualifying the potential effects of a particular policy design. Strongly pushed by the EU and the OCDE, an increasing number of countries adopt RIA provisions in policy formulation. While RIAs and policy evaluations are based on systematic inquiry, this study nonetheless excludes them from its definition of scientific expertise. The reasons is that they constitute policy instruments themselves. They are standardized, legally mandated, evaluated to their effect, are diffused and are part of standards of good governance. However, the mobilization of academic expertise for policy formulation is not a policy instrument, it is a practice. As such, it is less deterministic and gives actors more scope of action.

The third element of the definition pertains to the producer of scientific expertise. As Siefken (2010) rightly notes, there is a proliferation of sources of policy expertise. Indeed, providing science-based advice to decision makers is a business with its own economy. Amid this functional equivalence, the answer to which producer counts as scientific is one of attribution. In other words, for the purpose of this thesis, it depends on whom policymakers turn to when they seek analysis with scientific credentials to support its credibility.

The definition's fourth point addresses the issue that there are several 'bridges' that connect scientific knowledge production to public policy-making (cf. Stone, 2002; Weiss, 1979). This research's focus on scientific expertise entails that long term mechanisms of knowledge transfer, like the academic training of the administrative elite or social learning, are secondary phenomena. Equally, also purely individual and routinized knowledge acquisition behaviors like consulting the scientific literature are at the phenomenon's margins. In other words, this study stresses the importance of *the social* in scientific expertise. It is an interactional phenomenon, which is also demonstrated by the fact that political decision-makers turn to other persons and not books for advice (Levin and Cross, 2004; Weiss and Bucuvalas, 1980).

The final point is about terminology. While I have thus far consistently used the notion of scientific expertise, the literature abounds with descriptors for the cogni-

tive product of systematic inquiry into the natural and social world which is oriented towards, produced for, or drawn on by projects of political problem solving: research, research information, evidence, systematic evidence, knowledge, science, trans-science, regulatory science, fiduciary science, mode–2 science, post-normal science, serviceable truth, science advice, policy advice, and expertise (cf. Nutley et al. 2007: 20, Weingart and Lentsch 2008: 19). As I discuss in section 2.3, some of these notions have a clear conceptual basis while others lack one. As this study does not stray much into the territory of a sociology of scientific knowledge, these notion's subtleties and connotations do not carry an enormous weight. More important, though, is to make explicit what terminology I use and with what intent. Apart from when reviewing the literature, I consistently, and interchangeably, use the terms 'scientific expertise' or 'science-based policy advice' to denote the phenomenon as defined in this section. For stylistic diversity and brevity I may also use the short forms of expertise and policy advice.

1.6 Plan of the thesis

This thesis consists of 9 chapters. After this introduction, chapter 2 discusses the state of the art in literature on scientific expertise. It begins with the delineation of the review's scope, followed by an analysis of the different modes of the science–politics relationship and of how Western political cultures conceive them. An assessment of literature on how political actors make sense of scientific evidence, and how the latter acquires credibility in the policy arena, follows. Turning to the knowledge utilization literature, the review identifies the key concepts of the field and presents lessons as to what determines its different modes. Scaling up from the consideration of knowledge utilization by individuals, the review engages with public policy scholarship on the place of scientific expertise in the policy process.

Chapter 3 presents the theoretical framework. Drawing on actor-centered institutionalism, discursive institutionalism, and problem governance theory, this outlines a notion of an advisory system and develops propositions as to how the structure of policy problems shapes expertise mobilization decisions and their consequences on policy politics and design.

The analytical strategy is outlined in chapter 4. It consists of a two step approach: first, the Swiss advisory system and the distribution of access to expertise therein are characterized. Second, determinants of expertise mobilization and its outcomes are assessed in three case studies of policy formulation. The chapter details the comparative case study research design, provides details of how interview data and archival material were gathered, and explains the interpretive approach.

Chapter 5 marks the beginning of the empirical part of the study. It assesses the demand and supply structure of scientific expertise in Switzerland, and discusses how these components of the advisory system interact with the political system, especially with regard to increased political polarization.

Chapters 6–8 are the case study chapters. Each details the role that scientific expertise played in a particular decision-making process. Chapter 6 analyzes the mobilization of scientific expertise in connection with the federal government's decision to initiate a legislative process to govern research with human embryonic stem cells. Chapter 7 looks at the making of the CO_2 emission reduction act between 1990 and its final enactment in 2000. Chapter 8 looks at the new fiscal equalization reform, from its inception in 1991 to a public ballot vote in 2004. Each chapter contains an overview of the decision-making process and other relevant background information, details the influence of path-dependencies on the decision-making process, and elaborates the mobilization of expertise by different actors. The case studies then look at how this expertise is deployed in arenas of interaction. Finally, a concluding section offers an interpretation of the findings.

The conclusion, chapter 9, brings the empirical findings from the preceding empirical chapters together and assesses them against the backdrop of the theoretical framework presented in chapter 3. A discussion of the generalizability of the findings offers a foundation for outlining the study's implications in terms of the adequacy and efficiency of advisory processes, as well as with regard to democratic accountability. The thesis concludes with an appraisal of the theoretical contributions of this research to the study of scientific expertise.

Two

State of the Art

2.1 Introduction

This literature review focuses on conceptual and empirical scholarship connected to the puzzle of *how science informs public policy*. The chief rationale for conducting such a review is the constitution of a frame of reference – a sort of baseline. It informs the reader of existing research on the matter; it sets the backdrop against which the relevance of the present research is argued; and it constitutes a substantial input for the conceptual reasoning developed and presented in the subsequent chapter.

The literature on scientific expertise is massive. But it is profoundly compartmentalized. Work has been done in the fields of science and technology studies, evaluation and knowledge utilization studies, organizational studies, policy analysis and public policy, and – increasingly – by scholars working in economics, healthcare, and environmental sciences who reflect on their own advisory practice. To date, there has been little sustained and fruitful interaction between the intellectual communities studying science in policy. The mutual engagement amounts to little more than political scientists borrowing the concept of 'knowledge utilization' from the literature of the same name (e.g. Boswell, 2009; Schrefler, 2010; Weible, 2008), while the latter and science studies have largely kept to themselves. An important aim of this review is thus to bring these bodies of scholarship into contact with each other. But claiming that one broadly defined phenomenon has commanded different lineages of conceptual thought neither entails that they are lacking within themselves, nor that they are *a priori* incommensurable.

All intellectual endeavors need boundaries in order to derive meaningful insights. This applies to the present review, too. Thus some criteria are necessary for identifying which scholarship is relevant regarding the phenomenon of interest. In

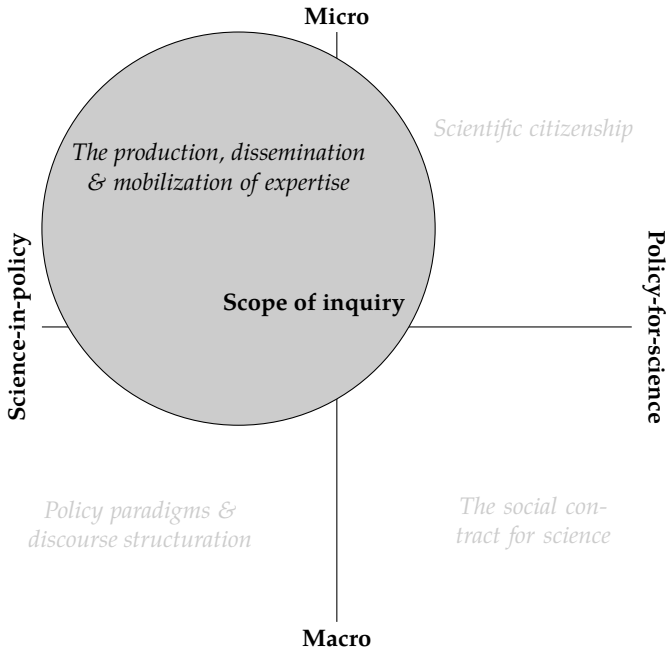

Figure 2.1: Issue demarcation along two axes. *Source:* author's illustration.

this case, these criteria focus on the direction of transactions between the social domains of science and politics, as well as on the ontological scale of the phenomenon (Figure 2.1). The first criteria entails a distinction between 'science in policy', to denote the use of scientific inquiry and expertise to inform public problem solving, and 'policy for science', for alluding to policies aimed at governing the funding and conduct of scientific research. This conceptual template has been laid out by Harvey Brooks (1964: 76, cited in Jasanoff 1990: 4ff.). But as both he and Jasanoff (1990) acknowledge, the governance of science (policy for science) cannot be fully disassociated from science in policy. These different aspects of the relationship between science and politics are more like two sides of the same coin. For instance, a particular science funding policy may be the result of the articulation of a problem through science, which has been taken up by the political system (e.g. climate change). This reflexivity between science and politics in the production of policy-relevant research has been acknowledged and advanced as a critique of the image of science speaking truth to power in a straightforward, unidirectional and linear fashion (e.g. Böcher, 2007; Habermas, 1976; Hoppe, 1999; Weingart, 2001). The interactive nature of science and politics in society make it clear that distinguishing

between science in policy and policy for science as an ontological statement falls short of what is being empirically observed. However, making use of this distinction as a filter for identifying relevant scholarship dealing *primarily* with how science informs policy is quite useful. Occasionally, and as necessary, the aspect of policy for science will enter this review and other sections of this research, especially when dealing with science policy.

The second demarcation criteria draws on the continuum between micro and macro processes of knowledge in politics, as proposed by Radaelli (1995: 177). In this classification, micro processes are understood as individual or collective action phenomena relating to the use of (social) scientific research in policy formulation. Macro processes are located at the structural and institutional level, examples of which are discourse structuration (cf. Hajer, 1995), policy ideas in the sense of paradigms (e.g. Hall, 1989), or the more recent 'discursive institutionalism' (Schmidt, 2008). This research, and consequently this literature review, is interested in processes that are located toward the micro pole of the continuum. As a consequence, the literature on policy ideas (e.g. Béland and Cox, 2011; Braun, 1998, 1999; Schmidt, 2008) will only occasionally be drawn on.

The review is structured around substantively similar clusters of scholarship, rather than around the research questions. However, the research questions will serve as an interpretation template for the conclusions. The review begins with the macro-level relationship between science and politics as it applies to scientific expertise and explores normative as well as historical aspects. It then zooms in to investigate how cognitive properties of policy-relevant science shape its mobilization in a policy context. At this point, the credibility of such knowledge is discussed. Next, the review begins to explore knowledge utilization dynamics. This begins with the presentation of the knowledge utilization concept, followed by discussion of the factors that shape knowledge use on the individual level. This provides the stepping stone from which to consider how policy politics and political institutions influence expertise mobilization in the policy process. A conclusion synthesizes the findings from the review and outlines the key findings.

2.2 Ordering models of science in policy

There is a normative as well as an empirical dimension to the relationship between scientific expertise and democracy. Until the 1960's, science in policy was treated primarily as a normative question of how to define the legitimate relationship between science and politics. This relationship was conceived in terms of a dichotomy between facts and values, whereby science was considered the ontological domain of matters of fact and politics as the one of matters of value. In the context of political problem solving, this fact–value dichotomy engenders a normative problem of whose authority trumps the other's in the definition and resolution of collective problems. If primacy was assigned to politics, then science might become subject to instrumentalization. However, if it was the other way round, then the democratic social order would be threatened by technocracy – or guardianship, as Dahl (1998) calls it. Either way, science in policy seems to constitute a problem of autonomy for the implicated social domains.

Habermas (1976: 120ff.) takes up this issue in a conceptual-*cum*-historical analysis where he identifies not only two, but three models of interaction between science and politics, labeled with the adjectives of *decisionist*, *technocratic*, and *pragmatist*. Habermas associates decisionism with Max Weber's postulated value neutrality of the social sciences and the subordination of expertise to the primacy of the political. Weber (1949: 54) writes that "[a]n empirical science cannot tell anyone what he *should* do – but rather what he *can* do – and under certain circumstances what he wishes to do" (original emphasis). Decisionism, thus, presupposes political primacy. For Habermas, this mode of interaction is matched to the rationality requirements of bureaucratization and the formation of the nation state. Technocracy, in contrast, is for Habermas the degradation of politics to a mere agent of technical necessity, which he diagnoses as the rationality requirement of the post World War II (WWII) world. At the same time, however, Habermas rejects the idea of clear and mutually exclusive primacy as too simple a characterization. Inspired by pragmatist philosopher John Dewey, he embraces the view that the science-politics relationship is in fact interactive, because the production of expertise is often dependent on value considerations for problem formulation, which is a political task. Consequently he

labels this interactive model as 'pragmatist'.[1] Technocracy *vs.* decisionism as the legitimate blueprint for the role of science in policy was subject to a broader intellectual debate in the 1960s, with remarkable differences between the United States and continental Europe. American scholars were rather distrustful of technocracy and embraced a decisionist view, whereby science had a legitimate place in enhancing the rationality of the means of politics, but not as a substitute for politics. In Europe, however, technocratic ideas had a more benign reception, with ideas about political planning being en vogue (Maasen and Weingart, 2005: 1).[2]

But beyond these normative debates, something actually happened to the relationship between science and politics. After WWII, more and more scientists were drawn into government to assist in the expansion project of the new welfare state. As political demand for expertise increased for informing and legitimating policy choices (the scientification of politics), expert disagreement was increasingly carried into the public arena instead of the sheltered realm of academia (Weingart, 1999, 2001). Weingart (1999) argues that such public disagreement among experts contributes to the erosion of scientific credibility. Thus, drawing on expert advice might actually engender a public controversy, rather than legitimating or enhancing the instrumental rationality of politics. Finally, expertise has become democratized because the pressure on the scientific community to be accountable for the public funding it receives has increased, and because expertise is increasingly in competition with participation as mode of legitimacy of public action (Maasen and Weingart, 2005). This means that justifying political choices with demands from social movements, an electoral mandate, or stakeholder preferences obtained through participatory processes has acquired more authority than referring to an expert opinion. What has also changed since WWII is the structure of government, which in the age of governance has become less centralized and more open to participation (Maasen and Weingart, 2005). But how this affects the role and form of science in policy is an open debate (cf. Falk et al., 2007; Koppo and Schölzel, 2009; Falk et al., 2010).

[1] These three modes of interaction have found application as a quasi theory of policy advice (Lompe, 2006; Sager, 2007) and served as conceptual backbone for more elaborate theories (Hoppe, 2005; Wittrock, 1991).

[2] On the rise and fall of steering optimism in Europe, see Braun (1995). At the same time, the virulent *finalization debate* took place in Germany about the societal role of science (cf. Pfetsch, 1979).

The normative perspective of how the science–politics relationship should be organized and the empirical reality of how it actually works in practice may diverge in their perspective, yet these images are actually interconnected and thereby shape practices of science in policy. This interconnection comes about when politicians appeal to the normative image and claim that their policies are substantiated by objective and disinterested science. Thus, they allude to a clear separation between politics and science, which for science advice does not exist in that form, but is crucial for legitimating policy. As Weingart (1999) claims, this is not only rhetorical action, as will be discussed in section 2.3, but also leads to patterns of drawing on science advice as if its practice corresponded to the normative image.

2.3 The epistemic dimension of scientific expertise

Scholars investigating scientific expertise have paid much attention to the issue of the authoritativeness of scientific expertise in the policy arena. Two interrelated practical concerns have motivated this inquiry. Firstly, the adequacy of social scientific inquiry for social problem solving is critically examined, and it is asked how such research conforms to user expectations. Secondly, and building on the first question, scholars are increasingly concerned with the quality of scientific expertise, having learned that the latter is subject to multiple and sometimes contradictory criteria of evaluation (cf. Clark and Majone, 1985). The ensuing scholarship comprises the rather distinct literatures of knowledge utilization (KU) and of science and technology studies (STS). KU studies have been preoccupied with the question of what makes science usable for a policy audience. Research has looked at what criteria policymakers rely on when they assess policy-relevant science. STS scholars, however, have been concerned with the credibility and authoritativeness of scientific expertise.

STS and KU research have problematized the nature of scientific expertise in different ways. While the KU project is largely about policy-relevant research from *social scientific* inquiry, STS has focused more on the 'hard' sciences. An important practical difference is that there is a plurality of sources of policy-oriented social scientific inquiry. Academic suppliers can be found alongside consultancy firms

and think tanks. Natural scientific research, conversely, is conducted primarily in university or government laboratories. Thus, the connection to science and basic research is much stronger in the latter than in the former. KU scholars talk about 'systematic evidence', 'research information', 'policy analysis' or 'policy advice' to describe the cognitive product of policy-oriented social scientific inquiry (cf. Nutley et al., 2007: 21ff.). STS scholars more readily use terms like 'science in policy', 'scientific expertise', or 'regulatory science' (cf. Weingart and Lentsch, 2008: 19ff.).

There are also different demarcation issues at stake. Especially early KU scholars attached much importance to the distinction between 'ordinary' or experience-based knowledge and systematic inquiry. At issue was the added value of systematic knowledge in the professional field of policy, which is dominated by puzzling and reasoning about highly case-specific and context sensitive issues. Lindblom and Cohen (1979) argued that the importance of social research for policy formulation is overstated by those who produce it. They contended that systematic inquiry is but one source of policy-relevant knowledge. Indeed, they attribute a higher practical value to so-called 'ordinary knowledge' or experience-based knowledge for social problem solving.[3] The distinction between ordinary and systematic knowledge also led to the stance that the former constitutes part of the framework through which policymakers assess the plausibility of policy research (Emmert, 1985).

For STS, the demarcation issue is about the difference between basic science and expertise. The defining characteristic of expertise is that it addresses policy-relevant issues under conditions of uncertainty. Weinberg (1977) argued that policymakers primarily ask science for predictions rather than observations. Science's capacity to predict decreases the less homogeneous the unit of observation is (e.g. predicting the motion of an inanimate object *vs.* predicting human action). Moreover, such predictions often involve complex systems or non-linear effects. As a consequence, the questions of policymakers to science are often *trans-scientific* because they reach beyond the scope of questions science can answer. Nowotny (2000) characterizes expertise in similar terms. For her, expertise inherently transgresses well defined epistemic boundaries precisely because it is confronted with trans-scientific ques-

[3] Whether natural scientific knowledge is an appropriate model for practically relevant social research is also doubted by Flyvbjerg (2001).

tions. But expertise is also transgressive because it has to link together a very heterogeneous body of knowledge in order to derive predictions and because it needs to communicate to a very heterogeneous and not exclusively scientific audience. It is then not surprising that expertise is conflict prone. Jasanoff (2005b, 2010) shares the same conception of expertise and just like Nowotny (2000) thinks that it is necessary to rethink established practices and institutionalized routines of deploying it. Jasanoff's argument is that the production of expertise involves three bodies, each of which needs to be addressed in order to ensure its legitimacy. They are the knowledge base expertise draws on, the expert as a person, and the institutionalized bodies through which experts act.

But for STS expertise has not only been an object of inquiry in relationship to basic research. In the context of risk appraisal, there has been a lively debate about the place of 'lay' or 'local' knowledge within expertise. Brian Wynne and others have persistently argued against the disqualification of local knowledge systems, which at times uncover flaws of narrow expert rationality (Irwin, 1996; Wynne, 1996). This has been reflected in the development of practices such as participatory technology assessment, in which lay citizens deliberate on the risks and benefits of new technologies. But the recognition of the contribution of lay knowledge also introduces a demarcation problem in its own right, which Collins and Evans (2007) attempt to address with a substantive theory of expertise. Nevertheless, the STS debate on the demarcation of scientific expertise from other knowledge systems should not be mixed up with the above-mentioned KU debate on ordinary knowledge; the former is about the production of expertise, while the latter concerns utilization behavior.

The final difference on the treatment of expertise between KU and STS is the underlying theory of scientific knowledge. The constructionist approach, predominant in STS, stresses the social processes that underly scientific research. Truth claims do not achieve credibility on their own, but it is people who settle knowledge controversies. Moreover, social processes influence which problems receive attention and get funded. An often cited example is the controversy between Pasteur and Pouchet about the issue of spontaneous generation of life. Pasteur maintained that microscopic life forms can only emerge through reproduction, whereas Pouchet defended the point of view that such organisms spontaneously emerge. Ul-

timately, the elite of the Parisian Academy of Sciences, well disposed to Pasteur, set up a jury to decide the issue and ruled in Pasteur's favor. That not a demonstration of facts but a social agreement settled the controversy is one of STS's core insight. It is not nature that brings closure to a controversy but an agreement to stop arguing (Yearley, 2005: 29ff.). Collins and Evans argue that such social mechanisms of settlement also occur outside the walls of academe when experts engage with policy and society (Collins and Evans, 2002, 2007; Evans and Collins, 2008). However, recognizing the social nature of knowledge production and validation does *not* entail that scientific truth claims bear no resemblance to an external reality. The issue of realism is a different one (cf. Hacking, 1999).

For the most part, writers in the KU tradition, and also much political science writing on the policy process and expertise, blackbox the nature of expertise, which is implicitly conceived as an 'input' into the political system. However, as ties between STS and political science intensify, the propositions that knowledge arrangements are shaped by social forces (Hisschemöller et al., 2001) as well as that expertise is the product of recursive science–politics interactions (Weingart, 2001: 133ff.), are increasingly taken serious. For some like Nutley et al. (2007: 21ff.), foregoing an explicit definition of knowledge is even a deliberate strategy because the definition of accepted knowledge claims is subject to *in situ* contestation by social actors.

The following discussion will further elaborate on the initial characterizations of science in policy by addressing two specific questions: firstly, what makes scientific research 'usable' for political problem solving? Secondly, how does scientific expertise acquire and maintain credibility?

The analytical paradigm of policy

Usability of scientific expertise is a matter of customer satisfaction. It therefore matters how the customer, i.e. civil servants and politicians, perceives such expertise and what criteria he or she deploys in evaluating it. It is believed that the assessment criteria of scientific evidence used by policy practitioners are not the same as are used by scientists. According to Garvin (2001), scientists validate research findings according to methodological criteria of validity whereas policymakers judge them based on the anticipated political, economic and social implications should

they be acted on. Moreover, while there are elaborate rules in science for dealing with conflicting evidence, such as peer review, the political analytical paradigm deals with it expediently. Political knowledge, so Garvin suggests, is inherently case specific and contextual and unlike (natural)scientific knowledge, does not lend itself to generalization.

There is much evidence that the scientific and political analytical paradigms function differently. For instance, there is no empirical evidence supporting the claim that methodological properties of research influences its perception by the policy community. A Canadian survey-based study found no evidence that social scientific studies using qualitative or quantitative methods of inquiry would by used differently (Landry et al., 2001). This is also true in regard to other features of research design. While it has been argued (but without supporting evidence) that randomized social experiments – e.g. making a particular public service only available to a randomly chosen trial group in order to test the effectiveness of a policy intervention – would generate knowledge especially usable because it is essentially of the same kind of knowledge needed for policy (Stoker, 2010), empirical research shows that evidence from social experiments is not endowed with special authoritativeness and is very much subject to political scrutiny (Greenberg and Mandell, 1991).

More evidence about the specific nature of the political analytical paradigm is provided by Weiss and Bucuvalas (1980) who identified what they termed a 'truth' and a 'utility' test. The studied population – American civil servants in state and federal mental health policy organizations – assess the truthfulness of research reports in terms of scientific rigor (of the research process) and the plausibility of the research findings on the backdrop of the civil servants' personal knowledge in the field. The assessment of scientific rigor becomes more important the more the findings are counterintuitive to personal expectations. The utility test is based on the perceived relevance of a study, if its findings can be easily translated into policy (action orientation), and whether or not these findings challenge the status quo. A study's perceived utility increases when it charts possible action alternatives or challenges the status quo. However, action orientation becomes more important when a study is not challenging and a challenging study is more likely to be positively

assessed when its action orientation is low. The study finds no support for the hypothesis that research evaluation is conducted according to political and ideological criteria.

Also Hall (1989) observed something like a utility test in his explanation of why the Keynesian framework of macro-economic policy-making has been adopted by several countries. He argues that policymakers assess a policy idea in terms of its problem solving capacity, which comprises the economic, administrative, and political viability. Moreover, he identifies the advent of a new policy elite trained in the Keynesian paradigm as an important factor, allowing us to make a link to the plausibility test identified by Weiss and Bucuvalas (1980).

Cash et al. (2002) find further assessment dimensions of scientific expertise. They state that along with credibility, saliency and legitimacy matter. Moreover, they argue that these three factors are perceived differently by producers and addressees of policy-relevant science. Saliency refers to the perceived relevance of scientific information whereas credibility stands for its perceived plausibility. Thus far, their argument is congruent with the truth and utility tests identified by Weiss and Bucuvalas (1980). However, legitimacy is a new dimension. It denotes whether the institutions and procedures whereby the assessed expertise is produced lives up to expectations of fairness. Thus, it integrates into the assessment the very processes by which research information is produced and disseminated.

The question of what criteria define usable knowledge has also been studied as the question of how usable knowledge may be produced. Haas (2004) approaches this by suggesting that usable knowledge is composed of a substantive core (the epistemic dimension of scientific expertise) and procedural mechanisms governing its production and transfer. The characteristics of the substantive core are stakeholders' perception of the scientific credibility, political legitimacy and salience of the knowledge claim. The procedural mechanisms are what insulates research production against political interference of research production. Multiple sources of knowledge, mediated and aggregated by one organization, improve the legitimacy of knowledge as it decreases possible bias introduced by a single funder.[4]

Weingart and Lentsch (2008) and Lentsch and Weingart (2011a) further pursue

[4]See also Wilson (2007) who reaches identical conclusions in a literature review.

the question about the quality of advisory science. As has been argued by others (Clark and Majone, 1985; Haas, 2004; Jasanoff, 1990), and is reiterated by Lentsch and Weingart (2011a), quality assurance of science advice is not to be confused with peer-review of basic research. Certainly, science advice must be epistemically sound. More importantly, however, it needs to accomplish the reconciliation of epistemic robustness with normative expectations from the world of policy. In short, science advice has to be credible, it needs to be perceived as legitimate, and it is required to cater to the decision maker's knowledge needs. In the editors' view, quality assurance of science advice is essentially about how successful an advisory process is in reconciling these demands, which they attribute to the institutional design of advisory bodies.

Concluding this section, the literature discussed supports Garvin's (2001) claim that there is a distinct political analytical paradigm for the assessment of policy-relevant science. It is, however, necessary to clarify certain points. Firstly, this literature seems to be based on the population of civil servants, which constitutes a highly trained group of quasi experts. Thus, we are left in the dark about whether this analytical paradigm also applies to elected officials. Secondly, how a study is assessed does not tell us if and how it is integrated into policy formulation and design. Finally, it remains somewhat ambiguous to what extend legitimacy and credibility constitute distinct dimensions. We shall return to this point in the next section where credibility is discussed in depth.

Scientific credibility as a negotiated product

The credibility of policy-relevant science is one of the assessment criteria discussed in the previous section. The science studies literature has investigated scientific credibility in depth and this is why the present section discusses this subject in some detail. This particular literature stresses the importance of social processes involved in securing the credibility of a truth claim. This means that what we come to believe about the world is mediated by whom we trust. In the words of Shapin (1995: 257), "[a]ll propositions have to win credibility, and credibility is the outcome of contingent social and cultural practice". Scientific credibility has been studied both in a historical as well as in a contemporary context (e.g. Shapin and Schaffer, 1985).

Here, however, we shall focus directly on research that looks at how scientific credibility is secured in the context of science in policy.

Different authors have pointed to the importance of *boundary work* in securing the credibility of science (Gieryn, 1983, 1995, 1999; Jasanoff, 1987, 1990). Boundary work is rhetorical fence-building by which 'real' science is symbolically demarcated from non-scientific claims and other fields of social authority such as politics (Gieryn, 1983, 1995). The central proposition of boundary work is that the demarcation of science from non-scientific systems of knowledge is not established by Popperian or Mertonian norms of good science, but is the result of highly context-specific negotiations of what counts as such (Gieryn, 1995: 394ff.). These occur when "people contend for, legitimate, or challenge the cognitive authority of science – and the credibility, prestige, power, and material resources that attend such a privileged position." (Gieryn, 1995: 405).

Boundary work takes place when scientists interact with policymakers in order to provide expertise. As Gieryn (1995) argues, there is a symbiotic relationship between science and politics as both stand to profit from proximity. Through the delivery of expertise, science can demonstrate its social utility, which is essential to justify public research funding. By the same token, political decision-makers can legitimate their decisions by referring to scientific knowledge claims. However, clear demarcation between science and politics is essential for upholding authority within their respective ontological domains.

According to Jasanoff (1987), regulatory processes constitute such a situation. They uncover the indeterminacy of science, which exposes it to strains and politicization. Such deconstruction of scientific knowledge claims, especially in public, are harmful for science as well as for politics. Not only does it threatens the authority of science, it also reduces science's capacity to legitimate policy choice on which policymakers are dependent. Through several case studies on regulatory decision-making within the United States Environmental Protection Agency and Food and Drug Administration, Jasanoff (1987, 1990) shows how such situations are dealt with by making use of boundary work. She comes to the conclusion that epistemic uncertainties and indeterminacies are dealt with within these decision-making arenas by behind-closed-doors consensus-building negotiations between scientists and regu-

lators, followed by sharp public demarcation in order to legitimize the decision as being firmly founded on scientific evidence. The ultimate boundary work must satisfy public expectations about the division of labor between science advisers and decision-makers in order to uphold the legitimacy of regulatory science. In the United States context, these expectations frame a decisionist understanding of the science-politics relationship. This means that expert intervention in public decision-making is admissible as long as it appears to increase the instrumental rationality of decision-makers, but its social acceptability vanishes when experts appear to take decisions (Jasanoff, 1987; Lengwiler, 2007).

Boundary work, it appears, is context sensitive. Jasanoff's (1987; 1990) work on regulatory policy-making and the following case studies are all set in the United States federal government. But even within this particular institutional framework do we observe differences. For instance, Zehr (2005) shows that scientists' argumentative patterns in congressional hearing on acid rain held during the 1980s were characterized by scientists engaged in demarcation boundary work. In contrast, in the climate change hearings of the 1990s, scientists offered their advisory opinions much more readily without resorting to demarcation boundary work. Zehr explains this difference with the fact that climate scientists could back up their claims with the IPCC and the environmental modernization discourse, which constitute argumentative resources acid rain researchers lacked. Comparing the same domains, Campbell Keller (2009) further shows that the institutional contexts proper to each phase of the policy process increasingly curtails scientists' expression of values and requires ever more boundary work to reaffirm their political neutrality.

Boundary work is not the only concept used for investigating how credibility contests play out. Looking at how advisory reports by the National Academy of Sciences (NAS) achieve credibility or fail to do so, Hilgartner (2000) argues that how a study is 'staged' in public matters. He develops the concept of stage management based on the sociology of role play in everyday interaction as proposed by Ervin Goffman. A performance is staged in front of a public – it is visible. However, there is also a hidden side of the performance taking place backstage. It must remain hidden or its exposure would ruin the performance. Hilgartner claims that like a play, stage management is crucial for the credibility of advisory science. An expert

report's credibility is severely affected if its production process involving possible disagreement among panel members is exposed to the public.

The work of the authors surveyed here strongly suggests that the credibility of scientific knowledge claims is not the product of prescriptive epistemological criteria. Instead, credibility is the product of discursive strategies that aim to separate science from other rival, or autonomy threatening, ontological domains and by drawing a clear line between the backstage process of advice preparation and the public presentation of the final product. Credibility is not a given, but the outcome of a managed process (cf. Bijker et al., 2009). This survey also shows that boundary work is contextual and may differ across arenas and issues. However, the literature mainly investigates the American political context. While it is very plausible that the concept of boundary work is also applicable to other contexts, it remains to be seen whether it works similarly in different contexts.

2.4 Knowledge utilization

For the past 40 years, researchers working in fields as varied as evaluation studies, public health, management and organization studies, education, sociology, policy analysis, and political science have investigated how and under what circumstances research is used in policy and practice contexts. This field of the 'sociology of knowledge application' (Holzner and Fischer, 1979), nowadays referred to as the knowledge utilization (KU) literature, emerged in the United States during the 1970s when the federal government substantially invested into knowledge transfer initiatives in order to stimulate economic growth, to make space and military technology applicable for civilian purposes, and for adopting innovations by federal health, education, and human services agencies (Backer, 1991: 229). However, it was perceived that despite these initiatives supporting the production of policy-relevant social research, little research was taken up for the governance of social problems. This perceived 'mismatch' between the supply and demand for research constituted the trigger for much research on knowledge utilization (cf. Weiss and Bucuvalas, 1980; Wittrock, 1982). Nowadays, the empirical context of knowledge utilization studies is constituted by the evidence-based policy and practice move-

ment that has developed most prominently in the United Kingdom (cf. Young et al., 2002), as well as the international diffusion of policy appraisal practices like policy evaluation and regulatory impact assessment (cf. Dunlop et al., 2012; Radaelli, 2004; Turnpenny et al., 2009). It is fair to say that much of the KU literature is guided by the instrumental aim of enhancing the evidentiary basis of policy. Or, in a weaker formulation, one might say that KU research is problem-driven.

Knowledge utilization, it turns out, is a surprisingly complex phenomenon. The relative simple assumptions that there is a direct and linear link between a research finding and its application, and that research use necessarily leads to better outcomes have been invalidated already by Weiss and Bucuvalas (1980: 9ff.). Yet, this misconception of research use still lingers among us. Hisschemöller et al. (2001: 13ff.) capture the phenomenon's complexity by the means of four general principles:

- The *subjectivity* thesis holds that any knowledge is ultimately subjectively construed and acquires meaning by individual or collective interpretation. Pre-existing knowledge, assumptions and beliefs of the knowledge user consequently shape this interpretation.
- At the same time, the *corrigibility* thesis states that the evidential merit of a knowledge claim may be assessed by non-arbitrary standards. Thus, there are epistemic criteria by which knowledge claims can be judged.
- The *sociability* thesis postulates that the production, dissemination, and application of scientific knowledge constitute social processes. These processes are subject to the influence of social arrangements, which in turn are structured by power, resources and status. However, such social arrangements, too, are influenced by knowledge utilization, which makes it a reflexive process.
- Finally, the *complexity* thesis holds that the production, dissemination, and use of knowledge constitute interdependent processes. This applies to their properties as well as to their effects.

In what follows, I will first review how knowledge utilization is conceptualized. This is followed by a synthesis of factors that enable or inhibit knowledge use.

Making sense of knowledge use

Knowledge utilization (KU) is a polymorphous and partly contested concept. In their book-length review of the KU literature, Nutley et al. (2007: Chap. 2) distinguish among discrete, continuous, and stage models of knowledge use. The following discussion draws on this distinction for structuring the review, but relies for the most part directly on the original literature.

Among discrete models, three modes of KU are commonly distinguished in the literature. *Instrumental* KU broadly frames the translation of a research finding into a matching practice or policy. It is based on the assumption of rational decision-making with policy being the necessary outcome of evidence (Oh, 1997). But such utilization is rarely observed in the real world (Albaek, 1995; Caplan, 1979; Clark and Majone, 1985; Parsons, 2004; Shulock, 1999). Nevertheless, such a conception of an instrumental science-to-policy link continues to circulate in the scientific community and thereby reinforces the view that policymakers systematically ignore scientific evidence (Wilsdon and Doubleday, 2013: 11). *Conceptual* KU alludes to what Weiss (1977, 1979) termed the *enlightenment function* of research. It captures the idea that research does not have a direct influence on policy, but gradually alters policymakers' understanding of policy issues. Weiss (1977) argues that while the influence pathways of such kind of KU are ambiguous, it nevertheless exerts a substantial impact over time. And then there is *political* knowledge utilization. It is commonly understood as the selective use of research evidence for the *ex post* legitimation of decisions that have already been taken or of non-decisions. But the use of research to legitimate rather than inform decisions is not synonymous with abuse of research. Research information, for instance, can sharpen and substantiate preexisting views and policy positions (Boswell, 2008; Hughes, 2007). Moreover, research use in organizations fulfills the symbolic function of signaling the capacity to take rational and informed decisions (Boswell, 2009). Feldman and March (1981: 2), for instance, argue that "information is not simply a basis for action. It is a representation of competence and a reaffirmation of social virtue". Albaek (1995) makes an even stronger case for taking the legitimation aspect of knowledge in policy seriously. According to him, legitimation is an important factor in conflict resolution.

Reasoned argumentation will not resolve conflicts of interest, he contends, because such beliefs are more part of utopian ideas about enlightened despotism than the reality of a democratic society.

There are also alternative conceptualizations of knowledge utilization. Whiteman (1985), and building on his work Greenberg and Mandell (1991), have developed a more *continuous* utilization typology. It features a dimension distinguishing between concrete and conceptual use, and another featuring a continuum ranging from substantive, over elaborative, to strategic use. In this typology, instrumental and conceptual use are both classified as substantive modes of KU, only distinguished by their concrete or conceptual orientation, respectively. The elaborative mode could be equated to what Boswell (2008) calls 'substantiating use'. It frames an incrementalist view where drawing on research evidence serves the purpose of refining an already existing framework, either on the detail (concrete) or strategic (conceptual) level. Strategic use, at last, signifies the tactical use of research as ammunition (cf. Weiss, 1979) when conceived as concrete action, or as a reaffirmation of preexisting beliefs and ideologies on a conceptual level.

The final kind of KU typology comprises stage models. For instance, Knott and Wildavsky (1980) argue that KU is not a single discrete action. Instead, they conceive of KU as a process of seven cumulative steps from coming into contact with research, to cognition, to conviction, to arguing in favor of a congruent policy, to the adoption of such a policy, to policy implementation, and to a positive outcome in the real world.

After thoroughly reviewing the literature on the conceptualization of research use and of the associated empirical findings, Nutley et al. (2007: Chap. 2) reach some instructive conclusions. They describe research use as a complex process in which one kind of use may lead to another. For instance, strategic use may engender more instrumental use at a later point in time. But if and how one kind of utilization leads to another is sometimes quite unpredictable. However, neither the discrete nor the stage models of research utilization adequately capture such an interdependence. Discrete utilization models only constitute 'snapshots in time' (Nutley et al., 2007: 46). Stage models also have a problematic aspect for they suffer from the teleological conception that research use must ultimately be instrumental.

Nutley et al. (2007) are not surprised that studies employing stage models show a progressive decline of use with each subsequent stage, given that conceptual use is more likely than instrumental use. Moreover, they see a key weakness in stage models for they do not account for political or strategic use of research. Given that one kind of research use may lead to another one, this seems problematic.

Determinants of individual knowledge utilization

After having discussed the utilization concept let us now turn to the factors that are believed to influence it. There is a wealth of studies investigating knowledge utilization in a policy and practice contexts. However, rather than reviewing individual studies I draw on two authoritative syntheses in order to outline the most important factors.

In a comprehensive review, Backer (1991) stresses that accomplished (instrumental) knowledge utilization implies that social change has taken place. Achieving change, though, presupposes the availability of resources and awareness of relevant knowledge. Moreover, as change redistributes resources, stakeholders have to be convinced that the adoption of a particular research-informed idea will work in the context of application, without engendering negative externalities or high costs. Thus, change management is of importance. Facilitating conditions in this process include interpersonal contact; planning and conceptual foresight about the innovation adoption; outside consultation about the change process; user-oriented transformation of information; individual and organizational championship for the innovation; and potential user involvement as facilitating factors affecting knowledge use.

Nutley et al. (2007: 81ff.) offer an even more comprehensive synthesis of the literature on the determinants of knowledge utilization. They differentiate among factors related to the research product, the personal characteristics of producers and users of knowledge, the links between these two groups, and the contexts of knowledge use. The identified research-related factors greatly overlap with the literature on the epistemic dimension of science in policy, discussed in section 2.3. On the producer side, this implies that research has to be credible and provide uncon-

tested findings.[5] In following Lentsch and Weingart (2011a: 8), we can assimilate this to the label of *epistemic robustness*. "[E]pistemically robust knowledge claims do not leave any room for interpretation, cannot be disputed by competing evidence, and, thus, cannot be abused." (ibid). Moreover, and this is in line with the definition of political robustness,[6] research needs high-level political endorsement, takes into account local preferences, is timely and relevant for the user audience and takes its preferences into account while being presented in an easily accessible format.

The personal characteristics of research users and producers comprise the following elements: Individuals are more likely to use research when they have a positive attitude towards the utility of research use and have the cognitive skills to interpret research evidence. Similarly, researchers' lacking knowhow about research dissemination impedes knowledge utilization.

In terms of linkage properties, individual and organizational knowledge brokers can effectively bridge between research producers and its audience. This also applies for direct interaction between producers and its audience, especially when this takes place in form of face-to-face interaction (also stressed by Shapin, 1995) or through channels that allow for two-way exchange of information.

Nutley et al. (2007) also identify contextual elements from the literature, pertaining both to research production and use. Contextual factors of the policy arena that are conducive to research uptake are the congruence of the proposed research with the prevailing ideology and agency interests, as well as with established ways of thinking and acting. Also an organizational culture that is supportive of evidence use is seen to matter. Moreover, an open political system and social arrangements that bring researchers and policymakers into contact are judged favorable.

As instructive this literature is, it essentially focuses on the individual as unit of analysis. Especially in survey research, it is the individual who looks for information and processes it, and when contextual factors are examined, they are construed as influencing the individual's propensity to interact with research in a given way.

[5] In regards to the use of social science in environmental decision-making, Renn (2001) argues that in case of expert disagreement, it is crucial that they agree at least on what they disagree about.

[6] "Political robustness of knowledge refers to the acceptability and the feasibility to implement recommendations based on it. An advice is robust if it can be politically implemented and meets the needs of the policymakers. Political robustness normally implies that the knowledge and the preferences of those who can be considered stakeholders are taken into account" (Lentsch and Weingart, 2011a: 8).

For Nutley et al. (2007: 302), the consequence is that

> "we know less about the potential for research to enter policy and practice at the organisational or system levels, in ways in which individuals may in fact be unaware. Much of what we do know about the use of research … concerns individual-level processes alone."

Also limiting is the tendency of KU research to focus on practice and policy domains where the state acts as a provider of services to individuals, as is the case in education, the criminal justice system, and public health. This leaves a blind spot on policy problems implicating complex social or ecological systems.

2.5 Expert advice in the policy process

From a public policy perspective, the Achilles heel of the aforementioned KU literature consists in its methodological individualism. Most empirical work is done using survey methods to assess attributes of individuals, or how certain environmental conditions affect those individuals. However, designing, adopting, and implementing public policy are collective action processes which predominantly involve composite actors (Scharpf, 1997: Chap. 3). Consequently, processes of information processing have to be construed in social rather than individual terms. There is a growing body of (still primarily theoretical) scholarship that investigates the role of scientific expertise, which takes the social ontology of the policy process seriously. There are also some overlaps with the development of theories of policy change.[7] One way these policy process frameworks refer to academic expertise is by ascribing to it a role in building, reinforcing and challenging a particular policy frame. Because policy is conceived of as an actualization of a particular frame, expertise indirectly influences policy stability and change through shaping of frames (Weible, 2008). The bulk of scholarship, however, does not belong to such a framework. Among the contributions to be discussed below, some are concerned with how particular conflict structures shape the mobilization of expertise. Others look at the relationship between legitimacy seeking and the role of expertise therein. Finally, there is scholarship that looks at advisory systems.

[7] See the volume edited by Sabatier (2007) for a comprehensive overview.

Conflict theories

The common denominator of the scholarship reviewed in this section derives from a concern with policy politics as the driver of expertise mobilization. Yet how policy politics is conceived of varies between the different contributors. To begin with, the 'advocacy coalition framework' (ACF) (Sabatier and Weible, 2007) is an explanatory framework of policy change that integrates traditional explanatory factors, such as interests and resources, with cognitive ones, such as beliefs held by policymakers about cause and effect relationships that affect the policy issues they consider. It is believed that such causal beliefs shape decision-making. Research and knowledge utilization are central aspects of politics within ACF because policy disputes are conceived as disputes about the validity of causal beliefs about the world, as embraced by a particular policy community (Sabatier and Jenkins-Smith 1988: 123; Sabatier 1988).

ACF scholars have conceptualized the role of science and scientists in policy in two rather distinct ways. Firstly, scientists are seen as coalition members. Thus, they are not apolitical bystanders. The ACF emphasizes coalition membership of scientists because they constitute a strategic coalition resource. Coalitions use research and analysis to learn how a given situation affects their interests and values. Research utilization thus aims to secure the coherence of their own coalition through discrediting opponents' views and enlisting the support of public opinion (Sabatier and Weible, 2007: 152, 203). How research is used in a subsystem is a function of subsystem conflict levels (Weible, 2008; Weible et al., 2010). A distinction is commonly made between unitary subsystems with a single coalition, collaborative subsystems with two coalitions, and adversarial subsystems within which two coalitions oppose each other. Weible et al. (2010: 528) assume that

- adversarial subsystems are conducive to the political use of expertise;
- instrumental use declines with increasing levels of conflict;
- learning in unitary and adversarial subsystems takes place within coalitions and across coalitions, in the case of a collaborative subsystem;
- adversary subsystems more readily enroll scientists as coalition member;
- coalition members are more likely to coordinate with scientists when analytical approaches and policy core beliefs are congruent.

But the view that (political) conflict drives research utilization is challenged by Montpetit (2011), who argues that science itself may constitute a source of disagreement. Hence, the division among scientists may not necessarily be the product but the *cause* of subsystem conflict. He empirically substantiates this argument by drawing on his research on biotechnology subsystems.

The second way the ACF speaks to science in policy is more subtle and concerns values about political participation embedded in actors' belief system (Sabatier, 1988: 145). Such norms are about who legitimate participants in policy formulation are. Implicit in these values is a double dichotomy between different and mutually exclusive classes of policy participants, which pitches the elite *vs.* the public, on the one hand, and experts against elected officials, on the other. As policy core beliefs concern a particular subsystem and also form the locus of coalition formation, such participatory norms are likely to shape accepted ideas about how scientists and political actors should cooperate in a particular policy domain. This is illustrated by a case study of a natural resource management subsystem (Weible et al., 2004). It shows that a particular model of science-politics interaction asserting scientific primacy (science-push) prevailed, especially among scientists, even after the National Research Council revised its approach on natural resource management from a science-centric to a participatory one.

In a theoretical contribution, Braun (1998) ponders the possible contributions of scientific advice to political problem solving and how different conflict structures in policy arenas may influence this. His reasoning revolves around situations of positive coordination in which all conflicting parties stand to gain from a solution, but processual uncertainties complicate the search for a welfare-maximizing policy alternative. Braun contends that issues where positive coordination is possible are framed by conflicts about (monetary) distribution, conflicts about beliefs, and 'puzzling'. Issues fall somewhere between these three poles, and the politics of their resolution strongly depends on relative proximity to them. Redistributive and value issues (e.g. abortion) are not part of that problem circle, because they are structured as a zero-sum game: what one party gets, the other loses. Braun argues that in such situations, as well as in purely routine politics, there is little room or need for scientific expertise. This also applies to purely distributional issues where

other means than expertise (e.g. side payments) are necessary to obtain an optimal solution. This leaves arenas marked by conflicting beliefs or by puzzling as two possible avenues for scientific expertise. The former is dominated by advocacy coalition politics, where ill-structured distributional conflicts are transposed onto an ideational dimension. It is a situation where the question is not 'who gets what', but 'what is the acceptable definition of welfare', and thus of whose definition wins out. While such a situation is conducive for politicizing experts by enrolling them into a coalition, Braun somewhat diffuses the specter of experts as mere guns for hire to support whatever position is in demand. He reminds us that only reputedly independent expertise enjoys authority and that experts are ultimately also dependent on the functional constraints imposed by the science system. Thus, there are limits to unfettered expert pluralism. In contrast to ideational struggle about welfare definition, puzzling is induced by pressure from problems that are increasingly interdependent and complex. In such situations experts play a key role as rationalization agents of politics. Advisory institutions as well as epistemic communities provide a forum in which (technocratic) puzzling over complex problems is possible. While such experts are very much part of politics, their independence is assured by the fact that they are not driven by the (material) payoff from a certain policy alternative. Instead, based on their scientific insights, they strive for welfare optimization for a given problem.

Based on these considerations, Braun (1998: 813ff.) proposes a list of situations in which scientific expertise may be relied on as a resource for positive coordination. They encompass instances where scientifically reducible uncertainty means that problem framing and the identification of solutions are delayed; when new problems emerge that lack a problem solving routine; when problems are complex and interdependent; and when policies implicate professional systems such as science, law, health or education. Moreover, experts may arbitrate on contested matter of fact issues in relatively depoliticized issues. Finally, expertise may be drawn on for the evaluation of policy instruments.

Another way to frame policy politics and connect it to the mobilization of scientific expertise consists of characterizing the context of political problem solving in terms of conflict around the value–fact dichotomy. This theoretical construct lends

Table 2.1: Value and fact conflicts in problem solving

Values			Knowledge	
			Certain	*Uncertain*
	Consent	A	Utopian rationalism based on scientistic approach offering expert means to achieve agreed ends	Decisionism: relying on the decision-maker to choose from options and give weight to particular experts
		B	Problem: technical; Solution: calculation	Problem: information; Solution: research
		C	Science as problem solver	Science as analyst or advocate
		D	Instrumental use (routine)	Instrumental use geared towards learning
	Dissent	A	Expert 'neutrality', which is difficult to achieve because of demands for partisan advice to fulfill strategic goals	Pragmatic rationalism is the aim, seeking to clarify issues and to reach robust conclusions to satisfy commonly-found problems
		B	Problem: (dis)Agreement; Solution: Coercion or Discussion	Problem: knowledge and consent; Solution: ?
		C	Science as mediator	Science as problem recognizer
		D	Strategic use	Symbolic use or nonuse
		A	Ezrahi 1980; Rip 1985	
		B	Douglas and Wildavsky 1982	
		C	Hisschemöller and Hoppe 2001; Hoppe 2010; Hoppe and Wesselink 2011	
		D	Schrefler 2010	

itself to a four-celled typology, depicted in Table 2.1. The table compares the modalities of expertise mobilization that different authors have come up with. While individual authors might use slightly different conceptual language, the patterns they describe are strikingly coherent.

Expertise and political legitimacy

Alongside contributions that develop associations between conflict among (subsystem) participants in the policy process are others that stress the need of representative governments to ensure the legitimacy of their rule. They conceive scientific expertise as a means for securing legitimacy, which, under certain circumstances, is more or less effective.

Topf's reflection on how governments draw on expert advice concerns liberal democracies. He writes that

> "[t]he political formula of liberal democracy holds that the authority of elected governments lies in their being responsible and accountable to the electorate. It is by the success of their policies that governments submit themselves to judgment. By the same

> token, it is by demonstrating the policy failures of incumbent governments, and the superiority of their own policies, that opposition parties (putative governments) seek to replace them" (Topf, 1993: 184).

Topf further premises that the high value attributed to rationality in contemporary political culture obliges policymakers to demonstrate that they take into account relevant and authoritative social knowledge about the policy area in question. Such knowledge can either be 'representative knowledge' – that is, stakeholder knowledge – or be founded on expert pronouncements (Topf, 1993: 189). What matters, Topf argues, is not only whose knowledge is taken into account, but also the perceived legitimacy of the process by which advice is proffered and received. Topf contends that how and when governments draw on expertise is determined by the issue at hand. Issues are defined as problems that receive recognition on the political agenda. Topf pitches them against business as usual routines of public action.[8] Issues either implicate an existing routine, a dysfunctional one, or one that has yet to be defined. In the case of an existing routine, government has already put forward a problem diagnosis prior to the current term in office, either from the position of a contender or an incumbent. The problem diagnosis has consequently been validated by the election. Nevertheless, expert knowledge is not superfluous as the incumbent is in a situation of having to devise authoritative indicators that account how successful the government's action is in achieving the declared objective. As policy failure invites adjustment rather than the redefinition of policy objectives, there is no particular value goal implicated in agenda setting that might interfere with rational scrutiny of problem and solution. Topf thinks that in such an instance, government first turns to its own bureaucracy for expert advice, especially when matters are urgent – as might be the case in an epidemic. However, in the absence of such urgency, as well as when the government's expertise is contested by the relevant professional community, a study commission might be set up. Setting up a commission will then provide an authoritative basis for future policy while taking the issue off the agenda. Finally, when the state claims responsibility for a

[8] This seems identical to the distinction made between subsystem and macro politics by the punctuated equilibrium framework (cf. True et al., 2007). While issues do not necessarily belong to an existing domain of public action, the public visibility bestowed upon them by the media is what separates them from other public action such as policy implementation, which may go largely unnoticed by the larger public.

new issue, Topf thinks that government would go about mandating research (e.g. launch of a directed research program).

Building on her empirical investigation of the use of migration research in Germany, the UK and the European Commission, Boswell (2009) proposes a theory of knowledge utilization that aims to explain variation in terms of policy areas. Her first argument is that research use behavior is conditional on how organizations derive legitimacy. Organizations may do so through output or through symbolic adjustment to rhetoric or formal structure.[9] Instrumental utilization prevails in the former, while the latter is marked by symbolic utilization. For output-oriented legitimacy, outcomes of a policy initiative must achieve *visibility*; that is, they must be identifiable through some measure which then is picked up through the mass media, and the responsibility for this action must be *attributed* to the organization.[10] The mode of securing legitimacy changes to symbolic adjustment (making a speech, promising the elaboration of a plan of action, setting up a task force *etc.*) when attribution is high, but visibility of the effect is low. When neither characteristic is present, legitimacy-seeking is absent. Such modes of legitimacy seeking are not intrinsic to a particular policy area, but are the result of political dynamics. Boswell argues that symbolic utilization prevails in areas where the policy community values expert opinion as more authoritative than arguments advanced by laypersons or interest-based groups. She terms this a 'technocratic' as opposed to a 'democratic' mode of settlement. Instrumental use is ultimately a consequence of a policymaker's belief that drawing on expert knowledge can actually make a difference in terms of policy output.

Patzwaldt (2008) offers an analysis of scientific advice in German labor market policy under the Schröder government. She suggests that scientific expertise is a resource for enhancing the legitimacy of political decisions (with participation being another legitimatory resource). However, this legitimacy enhancing effect is conditional on the recognition of experts as legitimate participants in that policy area by other subsystem participants, as well as by the interested public at large. Her contention is that government cannot derive legitimacy for its decisions by unilaterally

[9] The latter captures the notion of 'procedural legitimacy' (cf. Bekkers and Edwards, 2007: 38).

[10] Attribution, it appears, is not necessarily performed by the media, otherwise the combination of low visibility and high attribution would be logically impossible.

mobilizing scientific expertise. Instead, the organization of the production and consultation process of scientific expertise needs to take into account the expectations of other powerful actors. The empirical analysis focuses on the question of how such expectations influence governmental actors in their decision to organize scientific advice, either under a regime of dependency (*ad hoc* structures, with advisers subordinated under a hierarchical control and command structure) or of voluntary cooperation (the desire to be relevant and to exert influence motivates independent and institutionalized advisory bodies to identify with the principal's objectives). Patzwaldt's empirical analysis shows that governmental actors used scientific expertise very strategically in order to garner support for their political vision. Their general expectation of advice was that it should be congruent with their political agenda. This was made manifest in the creation of a number of *ad hoc* advisory bodies whose general thrust was more easily malleable than the positions of preexisting institutionalized advisory organizations. Where opportunities for the political control of advice were not given, the selective use or ignorance of arguments as well as attempts to silence unwelcome advice were deployed as a containment strategy. Moreover, once a temporary committee outlived the government's strategic interest, it was suddenly left without the political support it previously received. Political actors only showed themselves receptive to advisory arguments when they lacked their own analytical resources, when they had not yet formed their own position, or when the latter was supported by the expertise. Patzwaldt also shows that advisory actors were not in a position to defend an independent argument in the policy arena. Instead, their arguments could only penetrate that space when they were brought in by a legitimate political actor that supported them.

Advisory systems

Studies comparing the functioning of scientific expertise across countries are sparse. Individual case studies focusing on one country or even on a single aspect of a national advisory system dominate the literature.[11] While it is thus possible to form

[11] See the following edited volumes for examples: Barker and Peters (1993), Benz (2012), Bröchler and Schützeichel (2008), Lentsch and Weingart (2009b), Lentsch and Weingart (2011c), Peters and Barker (1993), and Weiss et al. (1991).

an image of a particular national context,[12] these contributions mostly lack systematic reflection on how advisory arrangements relate to the political systems they are part of.

A recent effort, spearheaded by Justus Lentsch and Peter Weingart, aims for more systematization, but only focuses on the supply of advisory science. Starting out from the premise that successful advisory organizations must produce expertise that is at once epistemically and politically robust, they evaluated German advisory institutions (Weingart and Lentsch, 2008) and compiled two volumes of case studies on different countries (Lentsch and Weingart, 2009b, 2011c). But this enterprise lacks a genuine comparative heuristic, as Lentsch and Weingart themselves acknowledge (Lentsch and Weingart, 2009a).

Equally supply focused is work in a policy analytical tradition on advisory systems. Such work is not focused specifically on scientific expertise, but aims to understand the organization of all sources of advice within a political system. Craft and Howlett (2012), for instance, develop and present a model that aims to classify advice regarding its content. They distinguish between a substantive/procedural dimension (content vs. strategy focus of advice) and a time horizon (reactive vs. anticipatory). While such a typology certainly constitutes a clear heuristic amenable to comparisons, it, too, lacks integration with the institutional and cultural factors of a political system.

There are, however, comparative models, which conceive of systems of expertise as embedded in particular national political cultures. Renn (Renn 1995 cited in Heinrichs 2002: 50), for instance, distinguishes between adversarial, fiduciary, consensual, and corporatist models to describe the role of scientific expertise in a particular cultural context. An adversarial culture of expertise, typically the case of the US, revolves around the publicly visible validation of competing empirical claims. In the fiduciary system, which Renn attributes to Southern Europe, experts, based on personal connections, provide background knowledge and advice to political leaders, who take it upon themselves to define what constitutes the common good. The consensual model, prevalent in Japan, and the Northern European cor-

[12] The organization of scientific advice in the US, Britain, Germany, the Netherlands, and France is relatively well documented.

poratist model have in common that experts are involved alongside interest group representatives in policy negotiations. Such negotiations are less formalized and not publicly visible in the consensus model, whereas interests, including those of experts, are more clearly and transparently articulated in the corporatist model.

Jasanoff's concept of *civic epistemology* (Jasanoff, 2005a), joins Renn's earlier identification of expertise cultures. Civic epistemologies are politico-scientific cultures[13] which condition national responses to biotechnological issues such as stem cell research, abortion, genetically modified organisms, *etc*. By employing this concept, Jasanoff shows that responses to these issues have been significantly different in the US, Britain, and Germany, but that the type of response has remained considerably consistent across issues within a given polity. Of special relevance regarding national cultures of expertise are her discussions of the basis of trust in expert knowledge claims; the foundation on which somebody is recognized as an expert; and the visibility of expertise bodies. In the adversarial US context, settlement of competing claims of expertise works through litigation. In Britain, trust is based on the expert's persona as a servant in the public's interest. And in Germany trust is largely role-based, meaning that a particular person comes to be trusted as an expert because of his or her affiliation, rather than personal virtue. This dimension is not entirely disconnected from what makes somebody an expert. In the US it is professional qualification and merit, while personal experience is valued in Britain, and German political culture conceives experts almost as ambassadors of a particular field of knowledge. Lastly, there are also differences in the transparency requirements of advisory councils, which are most far-reaching in the US, with Britain in the middle, and Germany at the tail.

While not explicitly designed as a cross-country comparison heuristic, the Dutch concept of *boundary arrangement* also proposes concepts for capturing the organization of advisory systems. Its proponents argue that science advice consists of both *demarcation* between science and politics, as well as *coordination* between these realms (Bijker et al., 2009; Halffman, 2003; Hoppe, 2005). Demarcation and coor-

[13] Jasanoff (2005a: 259) discriminates among six dimensions of civic epistemologies: 1) styles of public knowledge-making; 2) public accountability and the basis of trust in expertise; 3) demonstration practices of the effects of technoscience; 4) the registers of objectivity; 5) the foundations of expertise; 6) the visibility of expertise bodies.

dination are seen as two faces of the same coin. Boundary work (demarcation) is necessary for expertise production in order to delimit the participants in the transaction and prescribe their roles. Boundary work constitutes the precondition for cross-boundary coordination to occur. Coordination implies the mutual stabilization of expectations about what constitutes acceptable roles and practices in cross-boundary interactions. In Hoppe's words:

> "the simultaneous practices of demarcation and coordination together form boundary arrangements. They are systematized versions of how actors conceive of the division of labor between science and politics, conceptions or discourses that can be mobilized in boundary work (in more or less consistent ways)" (Hoppe, 2005: 206).

Boundary arrangements are enacted through discursive practices and thereby structure advisory work within organizations or entire policy fields. Hoppe (2005) argues that there is a plurality of possible boundary arrangements, which are defined by the terms of the science–politics division of labor. Such terms take into account the primacy of science or politics in issue definition and whether problem solving is pursued in cooperative or antagonistic terms. This context specific understanding of the division of labor is made explicit in boundary work discourses. An empirical validation of this proposition confirms the postulated diversity of boundary discourses and the self-ascribed roles of actors involved in science–politics transactions (Hoppe, 2009).

Not only is there great variety in the perceived roles enacted by boundary workers, there is also variability across time. Scholten (2009) analyzes the production of migration research by the Dutch scientific council for government policy. His analysis shows that there are variations in boundary arrangements over time that have been actively shaped by the council. Boundary organizations are thus not passive boundary stabilizers but engage actively in boundary work. Similarly, Scholten and Timmermans (2010) ask whether there is a link between the observed boundary arrangement and the prevailing policy image in migration policy. In a paper comparing the Netherlands, the United Kingdom and France, they show just that. While policy punctuation follows country-specific institutional logics, the authors find that a multiculturalist policy image coincided with a technocratic mode of science–politics coordination. The latter accords issue control to science while the science–

politics boundary is relatively diffuse. The emergence of a universalist policy image also displays connections to a mode of coordination that accords more primacy to politics and tends to draw a sharper boundary between politics and science (enlightenment). Finally, an assimilationist image emerged, yet again connected to a different coordination mode of engineering. The latter denotes political primacy with a relatively diffuse boundary.

In conclusion, typologies of expertise organization, the concept of civic epistemology, and that of boundary arrangement constitute tools that enable comparative thinking, even though truly comparative empirical studies remain scarce.[14]

2.6 Taking stock

In this chapter I have discussed literature pertaining to three broad aspects of scientific expertise. Firstly, I introduced normative principles that govern societal expectations regarding the legitimate place of science in policy. Secondly, I turned to the cognitive dimensions of scientific expertise. This implied the presentation of different conceptions of expertise, the political appraisal thereof, and the social processes by which scientific truth claims acquire credibility. Lastly, I devoted substantial attention to exploring the dynamics of expertise mobilization. On the one hand this involved a close look at the concept of knowledge utilization and its empirical determinants at the individual level. Understanding expertise mobilization as a product of collective action, on the other hand, involved examination of public policy theories about expertise.

Arriving at the end of the review, it is time to take stock. The review itself was inductively structured according to the common denominators of a particular cluster of literature. This final assessment, however, should be carried out through the lens of the research as a whole in order to be made useful. To begin with, this assessment should yield insights into the ontology of scientific expertise. Then, it should provide answers to the two research questions about the determinants of expertise mobilization, and the consequence(s) of the latter on the policy process.

[14] Jasanoff (2005a) offers the most accomplished study in that regard. Boswell (2009) and Scholten (2011) contain comparative elements, which are, however, not as clearly specified as in Jasanoff (2005a).

The ontology of scientific expertise

Concisely stated, the ontology of scientific expertise may be summarized by two statements: it is more than information; and it is a geniunely social phenomenon. To begin with the first, scientific authority constitutes a symbolic resource and is deployed as such in the policy process. Like scientific propositions, policy proposals must also win credibility in order to gain the support of a majority. Early modern science developed social technologies of credibility that have been extremely successful in mediating trust through institutions. These technologies have also proven very influential in the design of representative democracies. Because of this, science has acquired a significant cultural authority in Western societies (Ezrahi, 1990; Latour, 1993; Shapin and Schaffer, 1985). When policymakers draw on science, it is not just to inform policies, but also to bestow their proposals with the symbolic values of rationality and objectivity that science stands for (Albaek, 1995; Boswell, 2009; Feldman and March, 1981). Examples of such performances include President Obama's first inaugural address, in which he promised to 'restore science to its rightful place' (Obama, 2009), as well as the UK's labor government under Tony Blair with its program of evidence-based policy-making (cf. Parsons, 2002). Positivistically inclined researchers employing the utilization concept tend to distinguish between proper and improper use of expertise. Only when there is 'instrumental' or 'conceptual' (i.e. policy learning) utilization does the latter have an effect, while any other use is just beating around the bush (cf. James and Jorgensen, 2009). This is a very narrow vision and has led to a neglect of the effects of science in policy other than 'discursive' ones, which leave traces in policy proposals and decisions. However, the reviewed literature offers several examples that warrant a serious examination of what one might call scientific expertise's 'unintended' consequences in policy.

Regarding the social nature of scientific expertise, it is more appropriate to characterized it as a process of knowledge creation rather than the aggregation and communication of pre-existing knowledge. Much thinking about scientific expertise is based on an asocial model of science which conceives of knowledge production as free from any social influence. Consequently, scientific expertise is construed as something established and given prior to being engaged with in a policy context, in

which it is presented in a purified form, devoid of any social attachments.[15] Such a notion of expertise does not only black-box the social, it also suggests a linear process from knowledge to action (cf. Sarewitz, 2004). But this conception of scientific expertise is flawed (Böcher, 2007). Scholarship in the tradition of social studies of science consistently shows that scientific propositions win credibility as part of a negotiated social process and that controversies are settled by social agreement, not by facts alone (cf. Yearley, 2005: 29).[16] In the case of scientific expertise, agreement about what constitutes the relevant knowledge base is part of the advisory process itself. Thus, knowledge production stretches well into policy negotiations themselves (Jasanoff, 1990). In fact, it may well be possible, as was the case for the Montreal Protocol on ozone depletion, that political action precedes scientific consensus – despite the fact that the Montreal Protocol is a celebrated case of science-based policy (Pielke Jr., 2010).

What explains expertise mobilization

The KU and policy process literatures form a basis for deriving insights into the causes of expertise mobilization. The presentation of the KU concept revealed that research use takes on different forms, often described as instrumental, conceptual (or enlightenment), symbolic, and strategical uses. To be clear, KU is fundamentally a behavioral concept. It has been consistently applied to the study of research utilization by individuals, using survey methods. Consequently, and to reiterate the verdict of Nutley et al. (2007: 302) quoted earlier (section 2.4), "[m]uch of what we do know about the use of research … concerns individual-level processes alone."

Given the collective action nature of public policy processes, behavioral studies of research utilization are thus of limited value. This is where political science scholarship comes in. While the latter takes collective action seriously (as does STS), some contemporary political science scholarship on scientific expertise (e.g. Boswell, 2009; Schrefler, 2010; Weible, 2008; Weible and Sabatier, 2009) has unquestioningly adopted the knowledge utilization concept. Somewhere along the road,

[15] On the notion of purification and its importance for modern science, see Callon et al. (2009).

[16] This is not to say that scientific facts lack a realistic foundation and that political relativism is justified. However, the quote 'everyone is entitled to his own opinion, but not his own facts', attributed to Daniel Patrick Moynihan, falls short because facts don't speak for themselves, but require social arrangements in order to acquire credibility.

the knowledge utilization concept has simply been scaled up from individual behavior to the description of interactions between collective actors.

Nonetheless, conflict theories (section 2.5), in particular, demonstrate that scientific expertise may play different *roles* in public policy, depending on the dynamics of policy politics. Scientific expertise may be deployed in an engineering-like capacity when goal conflicts and knowledge controversies are absent. It may equally contribute to 'puzzling'[17] when goals are agreed on, but knowledge is uncertain. However, when knowledge is certain but goals are contested, then scientific expertise can at best play a mediating role. Finally, when knowledge and goals are contested, there is little space for expertise, other than in clarifying what is at stake. The legitimacy theories (cf. section 2.5) nicely underscore to what extent the mobilization of scientific expertise is a means for achieving political currency (i.e. legitimacy), which is quite the opposite from the scientistic conception of speaking truth to power.

While the conflict theories lay a foundation for comparative work across different policy subsystems, the review could not find much literature on cross-national comparison. There are different national cultures of science in politics, as a result of different national historical experiences (Jasanoff, 2005a). But there is little empirical evidence for the conclusion either that every country is a unique case, or that there are countries that share substantive features in their advisory regimes.

At this point, theoretical contributions still outweigh empirical scholarship. In many cases, this yields clean-looking typologies that sometimes make us forget that empirical policy processes cannot readily be tamed to fit squarely into a single category.

Outcomes of expertise mobilization

What are the outcomes of experts and expertise becoming part of the policy process? The longstanding answer has been that the cognitive product of expertise informs solutions to political problems. Over time, however, this assertion has become somewhat more nuanced, as the tagline "from speaking truth to making sense

[17] Hugh Heclo (1974: 305) wrote that "[p]olicy-making is a form of collective puzzlement on society's behalf; it entails both deciding and knowing" (cited in Owens, 2011: 74).

together" (Hoppe, 1999) aptly describes. Initially framed as direct and unmediated impact on policy solutions, the knowledge utilization literature was quick to realize that expertise rarely produces such effects. Instead, the trickle-down image of 'conceptual' or enlightenment use (i.e. learning) has taken hold (cf. Weiss, 1977). It essentially means that we know that the involvement of expertise in matters of policy does produce consequences over time, but that the mechanisms at work are often poorly visible and hard to identify (see also Owens, 2011).

But in the light of the two ontological lessons that scientific expertise is at once more than information and a social process, it is important to look for effects of expertise beyond thought and talk. The KU concept falls clearly short here. It is naive regarding agency, as it mingles (individual) action intentions with their consequences (the force of deliberate intention frequently gets lost between arguing strategically with science today, and learning together in a few years' time). Moreover, the cognitive orientation remains present even in 'symbolic' utilization, as it is framed as pretending to do the real thing instead of doing it, and not as something different altogether. We are left asking, then: what alternative consequences may the mobilization of expertise engender?

To begin with, the mobilization of expertise does not only produce agreement and consensus; it may also be a driver of conflict. It is suggested that science fuels rather than appeases value conflicts in policy and becomes politicized in the process (Montpetit, 2011; Sarewitz, 2004). When the importance of science as a resource for policymakers in a controversy increases, it is likely that all involved actors look for scientific arguments that they can mobilize to support their own claims (cf. Weible 2008; Nutley et al. 2007: 51ff.). Science becomes politicized in the process because this dynamic drags intra-scientific antagonism – necessary and normal *within* science – into a context where science is expected to defend a consensual opinion if it is to speak in the name of truth (Weingart, 1999). Hence, the mobilization of science has an impact on politics.

Moreover, social arrangements that proffer scientific expertise may engender structural effects in addition to cognitive ones. Discussing think tanks, Stone (1996: 218ff.) argues for considering the tangible influence they exert through membership in policy networks (see also Medvetz, 2012). Guston (1999: 91) points in the

same direction when he defines the success of 'boundary organizations'[18] in terms of the capacity to stabilize the science–politics boundary through the internalization of boundary negotiations. Lentsch and Weingart (2011b) similarly talk about the need for advisory organizations to reconcile the sometimes conflicting demands of epistemic and political robustness in their advisory production. Moreover, as Greenberg and Mandell (1991) showed, an evidence gathering operation such as a social experiment puts in place a social infrastructure that serves as a foundation for an issue's survival, even in the absence of political attention. Such a containment function is also served by expert committees that are established to insulate conflicting issues from the political agenda (Timmermans and Scholten, 2006).

When drawing these insights together, an important lesson emerges: the mobilization of scientific expertise has consequences beyond cognitive effects, such as informing policy design and learning. The presence of scientific expertise may act as regulator of conflict, either providing a venue for depoliticization or by fueling it. This establishes a circular relationship between policy politics and scientific expertise. On the one hand political dynamics are thought to shape the role that expertise may play in the policy arena. On the other, expertise may fuel or appease conflict. Scientific expertise may therefore have consequences on policy (content) and politics (interaction).

This concludes the review of the literature. The next chapter takes up the lessons articulated here in order to build a theory of expertise mobilization and its consequences.

[18] *Boundary organization* (Guston, 1999, 2000, 2001) is the conceptual label for organizations whose purpose is to mediate between the scientific and political domain in society. They internalize and thereby stabilize the contested and contingent nature of the science–politics boundary. Internalization does not eliminate boundary conflicts, but contains them within a manageable space. Thus, managing boundary conflicts becomes part of the organization's activity. Boundary organizations may be encountered in areas such as technology transfer, management of research productivity, environmental and technology assessment, as well as science advice.

Three

Theory

3.1 Introduction

The literature review has provided us with an ontological description of scientific expertise, a set of assumptions about the connection between political conflict and expertise mobilization in the policy arena, and the insight that scientific expertise in policy deliberation may contribute to the substantive content of policy, but also to the mitigation *or* expansion of conflict in the policy process. However, reviewing the literature has not produced a comprehensive account of how institutions and practices of scientific advice relate to the political system they are part of. Nonetheless, it is suggested that country-specific epistemic cultures are relevant in that regard.

In this chapter I will develop a theoretical framework that addresses the two fundamental questions of this research: in what situations do participants in policy formulation draw on scientific expertise, and what are its consequence(s) for policy politics and design? While building on the lessons of the literature review, this theory building expands beyond the existing knowledge base in one crucial regard: it aims to offer an account not just of how political interaction dynamics affect scientific expertise, but also of how institutions and the policy process shape the availability of expertise and the arena of its deployment.

This requires several stages of argument. In a first step, the chapter briefly presents the neo-institutionalist framework that informs the theory's basic ontology. It then proceeds with a theoretical analysis of how institutions distribute access to scientific expertise, and how they shape regulative norms about due process in dealing with scientific expertise. A further section on action situations comprehensively elaborates the circumstances in which policymakers are likely to value scientific ex-

pertise as an action resource. It takes into consideration the institutional as well as the issue-specific elements that jointly make up action situations. Following this discussion of the conditions of expertise mobilization, the subsequent section looks at the latter's consequences on the policy formulation process. A concluding section draws these elements together and outlines a number of empirically verifiable propositions.

3.2 A neo-institutionalist tool kit

This theory's conceptual building blocks derive from a neo-institutionalist toolbox widely drawn upon by students of public policy. It has also been applied in two previous studies on scientific expertise (Boswell, 2009; Patzwaldt, 2008), both of which investigated the mobilization of social scientific expertise from a political science perspective. In her study on scientific advice on the German labor market reform under the Schröder government, Patzwaldt (2008) draws on *actor-centered institutionalism*, a type of neo-institutionalist theory developed by Renate Mayntz and Fritz Scharpf to study governance arrangements at the intersection of the state and civil society (Mayntz and Scharpf, 1995). The present study similarly draws on this conceptual toolkit.

Actor-centered institutionalism[1] offers a relatively narrow definition of institutions as a rule system that stabilizes expectations about mutual interaction. Institutions do so by offering rules and norms regarding appropriate behavior and due process; they also regulate which actor gets access to which resource, structure relationships between actors, and constitute corporate actors (e.g. the Constitution installs Parliament, bylaws establish an association).

Actor-centered institutionalism aims to explain the behavior of 'composite actors' (e.g. coalitions and organizations) because it is they, not individuals, that are the dominant participants in policy politics (Scharpf, 1997: 54). Composite actors are aggregates of individuals who show a significant degree of coordination in the pursuit of an intentional and shared goal. While the modalities of organization vary among composite actors, their individual members do not enact their personal pref-

[1] The following elaboration summarizes the original propositions of Mayntz and Scharpf (1995).

erences, but conform their behavior to the latter's *action orientation*. Action orientations are the equivalent of notions of 'role' or 'habitus', but for a composite actor. They are a necessary conceptual construct for explaining the rather large scope of action this lean definition of an institution affords. Action orientations are latent predispositions for meaningful action in a particular situation. What meaningful action consists of depends on a particular actor's perception of a *concrete* situation (the 'cognitive' element). Moreover, it depends on the norms a corporate actor adheres to, its (survival) interests, and its identity. These 'motivational' elements of an action orientation stem from the institutional rules that instituted an actor and may have experienced idiosyncratic adaptation and reinterpretation through the course of an actor's history. For instance, an environmental protection agency's identity is constituted by its legal mission to reduce environmental pollution. It has an interest in doing this because its legitimacy depends on a perception of it as effective in carrying out this mission. Its concrete action might be guided by a normative paradigm of sustainability that portrays environmental protection and economic development as compatible.

Actors are sensitive to the actions of others in formulating their own strategies. They develop *inter*action orientations, which may be described as anticipation heuristics of social interaction patterns within a particular situation. The crucial point about interaction orientations is that they are not hardwired to particular problems (Scharpf, 1997: Chap. 4). Problems of social coordination, of free riding, and of redistribution may engender particular actor constellation (i.e. game matrices). However, actors do not only consider their own benefits and costs in a problematic situation, but also care about how other actors are affected by it. This can greatly affect policy politics.

It is thus particular *action situations*, also called arenas,[2] that selectively activate action orientations. They induce problem pressure or provide positive incentives for action. They also provide specific action alternatives and grant access to particular resources. A well defined action situation affords a certain amount of predictability, and the crafting of anticipatory strategies, because an actor can anticipate

[2] I use the terms arena and action situation interchangeably, but do not use arena to describe action situations that do not comprise interaction.

with whom s/he will interact, what form that interaction is likely to take, and what the rules of the game are.

Arena has become the established term in policy analysis for describing interaction situations, especially in the analysis of governance regimes. But the concept is also used by researchers in the symbolic interactionism tradition, such as Clarke (2003, 2005). Knoepfel et al. (2007: 46) characterize a policy arena as a relatively structured and formally defined area in which public and private actors interact. In addition, Benz (2007: 5) emphasizes the functional bounding of arenas, meaning that an arena is constituted through a particular issue. Thus, an arena has much in common with the notion of policy subsystem (e.g. Sabatier and Weible, 2007; True et al., 2007), but does not *a priori* confine interaction to a group of specialists, but may also engage the public at large. While an arena is structured by institutional rules and norms (codified or not), it cannot be reduced to that. Unlike a venue, which designates an institutional site, it comes into being through a substantive issue.

In the spirit of Max Weber's interpretive sociology, Mayntz and Scharpf (1995: 59ff.) stress that the perception of a situation is crucial for explaining which aspect of an action orientation is activated. However, whether a particular action strategy is successful depends on the interplay of all the elements and thus acquires a subject-independent quality.

With the basic notions of institution, (inter)action orientation, and action situation now in place, the following sections make use of these conceptual tools in order to craft theoretical propositions about how their substantive features condition the presence or absence of scientific expertise in a given action situation.

3.3 Institutions

In order for scientific expertise to be enrolled into public policy formulation, it is necessary that a supply of relevant and usable expertise exists, or may be created, within a (politically) meaningful timeframe, and that there is either demand for it or a potentially receptive audience. Demand for and supply of expertise evokes a market metaphor (cf. Guston et al., 1997; Sarewitz and Pielke Jr., 2007), as well as the question of how to reconcile the different expectations of science and poli-

tics regarding 'usable' knowledge (cf. Caplan, 1979; Lentsch and Weingart, 2011b). This section does not treat the reconciliation of demand and offer, which, as some scholars have argued, are co-constitutive over the medium term (e.g. Jasanoff, 2004; Scholten, 2011; Wynne and Shackley, 1995). Instead, it focuses on political demand for expertise and how institutions regulate which actors have the capacity to access and mobilize it. Doing so requires specifying what 'good' scientific expertise represents for its users, how institutions allocate it, and how norms prescribe due process in its provision and 'consumption'.

Expertise as a resource

Scientific expertise is a resource for participants in policy formulation which they may use to achieve their policy-related commitments (Weible, 2008: 619). Because the consultation of expertise serves a purpose rather than constituting an end in itself, users have an inherently instrumental relationship to it. This limits the mobilization of scientific expertise to situations where it supports the goal of its user (a policymaker never mobilizes scientific expertise to argue that 'available evidence contradicts my plans, but I nevertheless pursue them').

As an instrumental resource, scientific expertise has two properties: its users value it as both information and symbol (Albaek, 1995; Boswell, 2009; Feldman and March, 1981; Shulock, 1999). Information reduces uncertainty about problematic issues by exposing their causal drivers and affording a certain power to project the effects of policy instruments into the future. In that way, information is an important action resource because knowing about the world enhances the ability to shape it according to normative preferences. As a symbol, scientific expertise signals competence, rational action, and a commitment to the common good rather than particular interests. The symbolic quality is bestowed by the cognitive authority that science enjoys in the Western world, which is a fundamental component of political culture (cf. Jasanoff, 2005a). The symbolic quality is conditional on expertise acquiring credibility (cf. section 2.3), for which respect of procedural norms of expert consultation is important. Participants in policy formulation are aware of these symbolic qualities. They enroll scientific experts and their opinions in order to win credibility for their own positions. Building majorities through persuasion and

the production of shared meaning is crucial, particularly when coercive or legally binding resources are absent (e.g. no unilateral decision-making power).[3]

Thus, scientific expertise is simultaneously information *and* symbol. While one or other property may be more or less visible depending on the *situation* of expertise mobilization, both are *always* present as intrinsic and inseparable features. Political science scholarship that has adopted the knowledge utilization concept (e.g. Boswell, 2009; Schrefler, 2010; Weible, 2008) thus errs in arguing that a certain style of using expertise produces these properties. However, the symbolic quality depends on how and by whom expertise is produced. Policymakers, for instance, are quite cognizant that, given capacity, they may themselves produce some of the analysis for which they rely on external experts, but that such analysis would never carry the same symbolic weight if not delegated to reputed experts. This explains why demand for external expertise frequently exceeds purely informational requirements (cf. Shulock, 1999).

Distribution of access

As with any resource for political action, the political system unequally distributes access to scientific expertise. To begin with, scientific expertise constitutes a resource that itself requires resources. Funding is necessary to organize academic experts into committees and to pay for their operational expenses as they engage in identifying, aggregating, adjudicating, and communicating available evidence. Moreover, identifying competent and authoritative experts requires cognitive resources. Users must also be in a position to offer an incentive, not necessarily monetary, to producers to engage in such a relationship, such as prestige (Patzwaldt, 2008: 17).

Only a few participants in policy formulation and negotiation are endowed with such resources while being simultaneously in a position to offer immaterial rewards. There is first a divide between the haves and have-nots in terms of public and private actors. While the state may readily be able to wield such resources, civil society actors such as interest groups and political parties may not. The num-

[3] For instance, Sabatier and Weible (2007: 152, 203) argue that expertise is a resource for securing the internal coherence of a coalition of actors, for discrediting an opponents view, and for enlisting public support.

ber of civil society actors with the capacity to mobilize scientific expertise is likely to depend on how well political parties and interest groups are financed. In wealthy Western states with a large population, private means to support particular interests may be aggregated in order to enable economies of scale. This establishes a capacity for privately mandated expertise and privately funded research institutions (such as think tanks). Alternatively, the state may sponsor political parties, thus subsidizing their access to expertise. While the latter scenario may apply in some small states, they nonetheless lack the possibility of economies of scale. Economy of scale is not only a question of pooling demand, but also supply. Small countries simply have fewer scientists than large ones; but the number of policy issues they have to deal with does not fall in proportion to population size. Thus, the ratio of scientific experts per issue (not per capita!) is smaller in small countries than in more populous ones, assuming equal per capita spending levels on higher education. If, for a moment, we ignore governance arrangements and cultural norms, and stick to the metaphor of an unregulated advisory market, we may conclude that more civil society actors can mobilize scientific expertise in large than in small nations, given a more abundant supply and better economies of scale. This would be conducive to more competing expert claims in public in large than in small countries.

However, even in the presence of economies of scale that enhance access to expertise by civil society actors, it is reasonable to assume that access to scientific expertise is biased in favor of public institutions, regardless of the political system. Public institutions, in turn, form an aggregate of composite actors amongst whom resources are similarly unequally distributed. For instance, it is unlikely that the legislative and executive branches of government are endowed with the same technical and administrative capacity, or have equal resources to appropriate them. How such resources are allocated most likely depends on the organization of the decision-making process.

The unequal distribution of the capacity to mandate scientific expertise is not the whole story. Public institutions as consumers of scientific expertise do not only control demand through the disposal of the necessary financial, cognitive, and reputational capitals. They may also keep out unsolicited expert advice, given they are in a position of power *vis-à-vis* experts. The latter are neither in an institutional

position of power, nor can use the threat of mobilization (as unions might call for a strike) if their opinion is ignored: they lack a constituency of human actors whose interests they may legitimately represent. Instead, scientific engagement in public policy is premised on the expectation that scientists provide disinterested and objective advice (Yearley, 2005: 160–1). Scientists may voice their opinion freely in public, thereby attracting attention to issues, but they cannot access the more closed venues of policy formulation on their own terms and initiative (cf. Campbell Keller, 2009; Hoppe et al., 2013). Instead, scientific experts require a sponsor (i.e. a governmental agency) who is a legitimate participant in policy formulation in their own right (Patzwaldt, 2008). This dependency on a sponsor curtails the scope of their engagement in the political arena. Strongly contradicting a sponsor will likely lead to expulsion from venues of policy formulation. Loss of access to power by exiting the policy forum is dangerous as the use of other influence channels (e.g. addressing the public through the media) may be fraught with obstacles, such as confidentiality agreements and the financial requirements of going public.

But not every producer of scientific expertise is quite so dependent on a (political) sponsor. Organizational factors may afford varying degrees of autonomy. Consultancy firms, for instance, generate their revenue based on mandates with clear contractual obligations. University-based providers may subscribe to the same contracts, but they enjoy more financial freedom as their income is not solely reliant on consultancy work. For academics, defection may engender a loss of access to power and of future consultancy opportunities, but it does not directly threaten their professional reputation or livelihood. The capacity to become emancipated from a political sponsor is further enhanced when a provider of expertise has a project-independent legal mandate and caters to multiple principals. As a rule of thumb we may say that the more focused on a single policy domain a provider of scientific expertise is, and the more its organizational survival is dependent on a project-by-project basis, the higher the pressure to be relevant for its client(s). Conversely, there are also limits for independence. Too much distance endangers relevance (Weingart and Lentsch, 2008: 19ff.).

In conclusion, the institutional distribution of financial resources in the political system, combined with the institutionally secured right to participate in policy

formulation, gives governmental agencies significant discretionary power concerning decisions about actively seeking or considering proffered advice. Such power is further compounded by the fact that there are hardly any formal statutes dictating when experts have to be consulted.[4] However, the power of institutional gatekeepers is offset by the organization of expertise providers. The less dependent financially they are on a specific project, and the more institutional autonomy they have, the larger their independence. Too much independence, however, comes at the cost of diminished relevance.

Norms

Gatekeepers and other sponsors of scientific expertise have considerable influence over the decision to mandate expertise. But they cannot deal with expertise entirely at will. Scientific expertise derives its value from the cognitive authority of science. This authority can only be successfully instrumentalized for political ends if, at least on the face of it, its provision and mobilization obey societal norms (cf. section 2.2). Such norms originate from at least two sources. Firstly, any regular and repeated social interaction is conducive to the stabilization and institutionalization of expectations (March and Olsen, 1984). The growth of the public sector and the increasingly complex nature of policy problems in fields as diverse as the environment and social welfare have multiplied contacts between government and science in these areas. While this has engendered a dialectical development of the 'scientification of politics' and the 'politicization of science', with sometimes unwelcome effects for scientific credibility (Weingart, 1999), it has also engendered a set of practices and routines of due process regarding the interaction between scientific experts and policymakers. On a macro-scale, this repeated interaction has also brought about an advisory market with diversified offerings from university, civil society, and private sector providers.

Secondly, and in contrast to more bottom-up foundation of norms through rou-

[4] It is important to distinguish here between policy formulation and implementation, for many laws prescribe a role of science in their implementation through the provision of measurements, definition of standards, or evaluation. But for policy formulation, such provisions are rare. Regulatory impact assessment may constitute an exception, but its spread and institutionalization is a recent phenomenon (Dunlop et al., 2012). The Netherlands is an exceptional case in itself, for tradition and legal norms require a governmental response to official advisory reports (cf. den Butter, 2011).

tinization, national civic epistemologies (Jasanoff, 2005a) encode norms pertaining to how processes of scientific expertise ought to be organized in society. Research on boundary work (Gieryn, 1999; Jasanoff, 1990), in particular, has aptly demonstrated that public commitment to such norms is imperative for the credibility of science in a regulatory context. These informal norms are made explicit through formal legislation in some jurisdictions. The US Federal Advisory Committee Act (Brown, 2009: Chap. 4) is a good example of transparency enforcing legislation. In other countries norms are less codified. Nevertheless, the scientific community has recognized the need for more transparency and strives for the codification of best-practice norms regarding scientific advice.[5]

To sum up this discussion, formal rules, routinization and political culture shape a normative framework that conditions expectations of *how* the production and consultation of scientific expertise ought to be organized in order to be legitimate. However, *if* and *when* scientific expertise is to be consulted depends on how a political system allocates financial, cognitive, and reputational resources for mandating scientific experts, on whether or not the population of a country enables economies of scale in pooling private resources for appropriating scientific expertise, and on the effective capacity of expertise providers to be autonomous *vis-à-vis* their sponsors. The intersection of these factors may produce different configurations for the control of expertise.

3.4 Action situations

Political life revolves around substantive issues. Issues are 'socio-ontological' (Marres, 2007) in that they bring people together around specific concerns. They are the necessary ingredients of any enterprise of collective action. Issues turn individuals and social groups into stakeholders, interested parties, and target publics. Once on the political agenda, issues become the object of institutionalized problem solv-

[5] In the US, this effort is spearheaded by the National Academy of Sciences (cf. Committee on the Institutional Means for Assessment of Risks to Public Health et al., 1983; Committee on Risk Assessment of Hazardous Air Pollutants et al., 1994; Committee on Risk Characterization et al., 1996; Committee on the Use of Social Science Knowledge in Public Policy, 2012). On the EU-level there is the *Taking European Knowledge Society Seriously* report (Wynne and Felt, 2007). For Germany, see the guidelines developed by the Brandenburg Academy (cf. Weingart and Lentsch, 2006). Also the Swiss Academies developed their own guidelines (Akademien der Wissenschaften Schweiz, 2011).

ing routines. Political scientists have long sought to understand whether the nature of an issue exerts an influence on the politics of its resolution. Moreover, some of the scholarship on scientific expertise discussed earlier (Boswell, 2009; Braun, 1998; Schrefler, 2010; Topf, 1993) addresses the same question regarding the dynamics of expertise mobilization and their link to the policy issue at hand.

In this section I propose an approach that links issues to expertise mobilization. This blends elements from a problem governance perspective (Hoppe, 2010) with ideas taken from discursive institutionalism (Schmidt, 2000, 2008) in order to fashion an 'expertise valuation heuristic'. The contention is that the anticipation of different kinds of policy politics by policymakers leads to different evaluations of whether the mobilization of scientific expertise may prove instrumentally effective in the realization of one's action orientation. This approach therefore requires the elaboration of an issue classification heuristic, the connection of this to different dynamics of policy politics and the roles of scientific expertise therein, and an explanation of how such dynamics are sustained in different regimes of power distribution.

Problems

Discriminating between different types of policies is a notoriously slippery business (Smith, 2002). Lowi's (1964; 1972) arenas of political choice is the best-known and most popular enterprise of policy issue classification. By linking policy design to policy politics, Lowi contends that 'policy makes politics'. He distinguishes between distributive, redistributive, regulative, and constitutive policies. But his typology is not exhaustive: it fails, for instance, to account for non design-related characteristics of political issues. A case in point is so-called morality politics (cf. Knill, 2013) – value-laden issues around birth, sex, addiction, and death. While such issues share a substantive core, their politics varies substantially according to national political context (e.g. Engeli et al., 2013).

Regardless of the (analytical) system of classification in use, issues only matter in terms of how they are perceived *in situ*. It is through framing that reality is made sense of, and, to follow the tenets of argumentative policy analysis (cf. Fischer and Forester, 2002), power is about persuading others to adopt one's frame (e.g. Hajer,

1995). But framing is more than representing a single (social) reality in possibly different ways; it is a tool of world-making, because it crafts a particular reality. The work of Robert Hoppe (2010), in particular that on problem governance with its "typology of the socio-cognitive status of problems for policy makers in political task environments" (Hoppe, 2010: 72), provides conceptual guidance in making sense of issue classification.[6]

Problems arise from valuations that compare an *is* and *ought* state of the world. This is ultimately a private and subjective process. In a political environment, however, problems are necessarily externalized through the claims of a particular group. They "are always claims of groups of people about the way they experience a situation" (Hoppe, 2010: 67). It is politicians who then cast such claims into broader narratives capable of mobilizing people beyond those who originally articulated the claim. In addition to this normative core, problems also contain a factual/empirical component in the shape of the *is* and *could be* assessments which always underlie claims. Factual assertions require justifications, which, in turn, have to be approved by groups endowed with epistemic authority. At their core problems are therefore constructs that link 'norms' and 'facts' through comparisons (Hoppe, 2010: 69).

We find a fact–value separation embedded in many public institutions and processes (Hoppe, 2010: 68–9). The bureaucracy, for instance, stands for technical and depoliticized competency, whilst being under the control of government – that is, the designated space of valuation. Another example is the distinction between risk assessment and risk management in US regulatory policy (Jasanoff, 1990). But the boundary between values and facts is not given, but constantly negotiated (as scholarship on boundary work demonstrates; cf. section 2.3).

Hoppe argues that the classification of public problems around the value–fact dichotomy is in fact a *socio-cognitive* complexity reduction heuristic of the political task environment (Hoppe, 2010: 70ff.). Political decision makers – endowed with bounded rationality that leads to analysis necessarily being supplemented by intuition – face two constraints: they cannot ignore the resistance of the world (not, primarily, the natural world in this case, but rather the socially constructed task en-

[6]The following discussion is based on Hoppe (2010) if not indicated otherwise. The same ideas are also developed in Hisschemöller and Hoppe (2001) and Hoppe and Wesselink (2011).

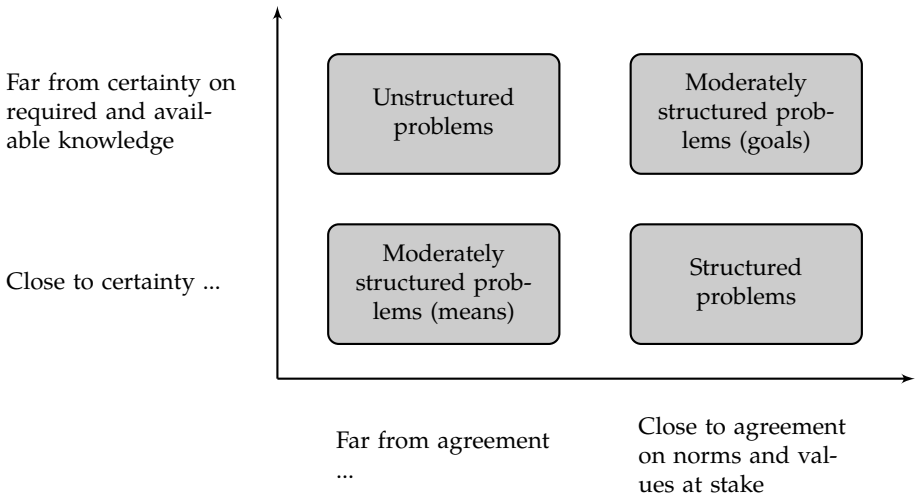

Figure 3.1: Four types of problem structures. *Source:* Hoppe (2010: 73).

vironment), for they always act in concrete situations, and they seek the approval of those to whom they are accountable. It is these constraints that prevent problem framing being the purely opportunistic exercise of some small group. Rather, problem construction is only successful if it is sensitive to the distributions of power and agreement in different fora – such as politics, administration, media and public opinion, and science – regarding three points: the degree of agreement on fact constructions; the degree of agreement on values; and the degree of agreement on the problem definition itself.

Figure 3.1 illustrates the resulting problem typology.[7] The perceived agreement or disagreement on values and on relevant knowledge at stake creates four types of problematic situations. Hoppe (2010: 72) likens *structured* problems (where there is agreement on values and relevant knowledge) to puzzle solving because they are conducive to routinized problem solving. Road construction, for instance, can fall into this category. At the other end of the scale are *unstructured* problems. These are characterized by policymakers perceiving a high problem pressure, persistent uncertainty regarding the relevant knowledge at stake, and either very unstable or highly divided elite and popular opinion. Unstructured problems often break out of their subsystems to become part of high politics. Dealing with them is difficult as trying to make them more structured often sparks other problems. Many issues

[7] This is in fact the same typology as depicted in Table 2.1.

related to recent biotechnological inventions, or to controversies around technical risks, may fit this description. In the middle there are two types of moderately structured problems, where there is perceived disagreement on one dimension (either values or knowledge), but not on the other. Moderately structured problems with *consensus on goals* still bear much uncertainty in their concretization, which can result in disputes about costs and political risk. Conversely, when the means are agreed on, but goals disputed (as is the case in many morality policies), there is not much debate about relevant knowledge. Instead, the debate focuses, often in black and white terms, on ethics.

This typology is of ideal-typical nature. Real world policy processes may fall in between cases, or even display traits of different problems because they harbor more than a single issue. Moreover, issue structures are not necessarily stable. Punctuation dynamics may suddenly and radically affect issue structure (think of nuclear power before and after the accidents at Chernobyl and Fukushima), and policymakers may also try to reframe issues through meta governance (Hoppe, 2010; Rein and Schön, 2002).

Policy politics and the valuation of expertise

Having elaborated the socio-cognitive underpinning of problem structuration, we can proceed with a discussion of how problems relate to the mobilization of scientific expertise. Hoppe (2010: Chap. 5) contends that different kinds of problem create their own policy politics, which in turn reinforces problem structures.[8] Each problem type is thought to be conducive to a particular network structure (cf. Hoppe, 2010: 132). The more structured a problem is, the more institutionalized policy participation, resulting in a closed network with a single belief system. Conversely, unstructured problems engender open networks with unpredictable participation. Semi-structured problems with agreement on goals give rise to advocacy coalitions with oligopolistic participation. Finally, value conflicts in the absence of knowledge controversies engender the design of *ad hoc* networks for depoliticization and accommodation.

[8]The recursive influence of problem and politics sets Hoppe apart from Lowi (1972), who establishes a linear causal relationship between policy design and politics (hence 'policy determines politics').

It is this understanding of network structures that provides a model for expert involvement (cf. Hisschemöller and Hoppe, 2001; Hoppe, 2010; Hoppe and Wesselink, 2011), which, incidentally, reflects Fung's (2006) juxtaposition of experts and the public sphere as two opposed extremes on a continuum of political inclusion. The more closed a network is, the more it is dominated by experts and technocratic rule-making. Conversely, in entirely open networks experts lose their authoritative position to judge about *is* or *could be* states and become just one of many (knowing) participants, though they may maintain a role as problem namers. In medium-structured problems with consensus around goals, experts may act as analysts or advocates, becoming enrolled into different advocacy coalitions. Finally, in medium-structured problems with goal conflicts, experts may become part of accommodation strategies in which they act as mediators. It is important to note that the notion of expert is used in this context to denote professional competence, which could include scientific experts external to government, but may also refer to the administration's internal technical competencies.

These are roles experts *may* enact should they become implicated in the policy process. But this is not yet the end of the road: further conditions require consideration prior to formulating concrete expectations. Firstly, we should not forget that the participation of scientific experts is conditional on their willingness to engage with policy, on their effective access to policy formulation through institutional prerogatives, mandates, or coalition membership, and on the availability of the necessary financial resources to enable participation. Secondly, it is important to keep in mind the *situated* perspective of problem perception. This is an intrinsically forward-looking perspective which faces uncertainty about outcomes of social interaction. Actor-specific problem perceptions and group claims may or may not stabilize into a broadly shared perspective. When issues arrive for the first time on the agenda of a jurisdiction, or when an external shock event brings in new actors and reshuffles resource distribution (cf. Sabatier and Weible, 2007), problem perception may be quite local. Moreover, Hoppe (2010: 75) argues that policymakers are biased in their problem perception because they prefer structured problems that can be resolved. In their (not necessarily conscious) avoidance of unstructured problems, policymakers may go as far as deliberately screening out information in

order to keep it simple and manageable.[9] It is important to reaffirm the situated perspective, because in making the jump from socio-cognitive problem perception to network politics, that indeterminacy tends to get lost as the gaze shifts from an internal to an external account. No longer are problems just perceptions and complexity reduction heuristics, they have been translated into the (singular) reality of interaction structures. This shift nicely illustrates Berger and Luckmann's account of the construction of social reality through an externalization of internal experiences (Berger and Luckmann, 1966); but we have to remain conscious that such construction processes always proceed in parallel to and in interaction with already established structures, and that expertise mobilization decisions are invariably motivated on the basis of a subjectively construed reality, rather than an objective one. Thirdly, not every issue has the same likelihood of becoming the subject of formal law making procedures. Very structured issues establish policy monopolies that resist punctuation (Hoppe, 2010: 132). Consequently, while entirely structured problems may establish a prominent intervention context for scientific expertise – Ezrahi (1980) illustrates this with the Manhattan and Apollo projects – they may not be very common objects of policy formulation. When also taking into consideration the above-mentioned pro-structure perception bias of problems, it is plausible that policymakers tend to be confronted more often with problems they perceive as semi-structured.

With these clarifications in hand, it becomes possible to formulate more accurate expectations regarding the relationship between perceived problem types and expertise mobilization. To begin with, it is unlikely that extramural scientific expertise is called upon to resolve highly structured and routinized issues (cf. Braun, 1998; Weible, 2008). Such issues neither induce much uncertainty about the policy process (who are the other actors, what are their intentions?) nor require support by scientific arguments to enhance a proposal's credibility. If external experts are mobilized, they likely keep a low profile within the confines of the administration, where they complement existing technical capacity.

Moderately structured issues where value questions prove highly divisive may

[9] See for instance Hoppe et al. (2013) who contend that the UNFCCC erred in assuming that climate change constitutes a structured problem.

contribute to action situations in which scientific expertise is not valued much, because there is little disagreement on the relevant and usable knowledge at stake. The priority is to contain conflicts and make problems amenable to resolution through, for instance, reframing (Rein and Schön, 2002), insulation from the political agenda by forming an expert committee for deliberation (cf. Timmermans and Scholten, 2006; Topf, 1993), or adopting procedural policy designs (Engeli and Varone, 2011). Trusted experts may assume the role of an arbiter between conflicting parties. But this is a meta-governance role and contributions to policy design are rather unlikely.

Conversely, actors capable of mobilizing scientific expertise are likely to value it when they perceive an issue as moderately structured with either a clear value consensus, or somewhat diffuse and inarticulate value incongruence. This reimagines what Braun (1998) calls a situation of 'puzzling' – value consensus enables rationalization of solution finding – as well as policy subsystems with moderate levels of conflict among advocacy coalitions (cf. section 2.5). The symbolic aspect of scientific expertise is of particular value in the latter situation as it constitutes a resource for winning credibility through persuasion.

But what happens in truly unstructured issues or issues that are ill-defined because they are emergent? Given the high uncertainty about the relevant knowledge at stake, and possibly the presence of crisis, it is far from certain whether the policymaker is in a position to clearly articulate his or her advisory needs and to identify potential experts (cf. Topf, 1993). It may also be the case that advisory capacity must first be created. There might be scientific research on the topic, but any such evidence still requires translation in order to become accessible. Moreover, policymakers in such a situation are ignorant about other actors, for an issue public has either not yet been constituted, or its composition fluctuates unpredictably. Institutional policymakers, the only default participants in such a situation, are therefore forced to refer to their own identities for cues about possible action strategies (cf. Patzwaldt, 2008: 64). In the context of public policy, such a situation is never pure, as some inference about political consequences is always possible due to the institutionally given structure of decision-making processes. The mobilization of expertise for conflict containment, akin to semi-structured value problems, would likely be ineffective because of ambiguity regarding the interlocutors. The open na-

ture of participation, however, would not preclude self-authorized experts entering the scene. Nevertheless, should institutional policymakers mobilize expertise, the latter would have a rather low public profile.

Expertise and legitimation

The preceding exploration of problems as the socio-ontological origin of interaction situations implicitly focused on policy formulation within the confines of the policy subsystem, where strategizing and anticipation of interaction patterns takes place with the policy community as audience. Yet the policy community is not the only relevant audience to witness (and participate in) policy formulation and decision-making. Arriving at collectively binding decisions in a democracy requires support not just from those most directly concerned (that is, input legitimacy), but also from the public at large. The latter is the ultimate judge on the orientation towards the common good and compliance with norms of distributive justice of policies (output legitimacy) (cf. Scharpf, 1997: 153). Governments are ultimately accountable to their electorate, which ensures that elections serve as a mechanism for enforcing congruence between expectations regarding policies and the effects thereof. Scientific expertise is not absent from the public arena. Yet we cannot describe mobilization dynamics in this arena by simply extrapolating from problem structuring dynamics. Policy communities and the public have different origins, with the first being established through issues, and the latter through the institutions of representative democracy. Issues come and go, but the public at large exists as long as the jurisdiction perdures of which it is part of. Hence, in order to accommodate the public arena as a venue for expertise mobilization, the theory as thus far elaborated requires extension.

This is where a conceptualization of the policy subsystem and the public as two distinct arenas – as proposed by *discursive institutionalism* (Schmidt, 2000, 2008) – becomes a valuable theoretical resource. Underlying discursive institutionalism is the assumption that the policy subsystem and the public arena differ in the way that actors mobilize existing discourses (i.e. policy images) for legitimating their positions in policy formulation.[10] Policy discourses – one could also call them paradigms

[10] Schmidt (2000, 2008) developed the notion of legitimation discourse for her 'discursive' blend

– provide a shared language and a common vision that actors may draw on as a strategic resource. In arenas of policy coordination between different public and private actors, the recourse to an established discourse may be crucial in overcoming disagreement. This *coordinative* function of discourse is especially prevalent in political system where power is diffused among multiple veto players, examples of which being Germany, the Netherlands, Austria, and Switzerland. In those countries extensive coordination is necessary in order to achieve agreement. In countries with a stronger power concentration, such as the UK or France, coordination in order to craft majorities is not as important, because the inclusion imperative is lower. However, policies require justification in the wider public. Governments do so in white papers, party programs, coalition treaties, and public as well as media appearances. And they do so by drawing on prevailing discourses. Schmidt (2000: 286) calls this the *communicative* function of discourse. While the two discourses are not mutually exclusive, the communicative function of discourse is more important in political systems with multiple veto players.

Because scientific expertise is an important component of policy images that underlie legitimation discourses (cf. Ingram et al. 2007: 109, Scholten and Timmermans 2010), it is plausible that dynamics of expertise mobilization roughly follow the mobilization of legitimation discourses. This yields two basic scenarios where expertise mobilization follows either the coordinative or communicative discourse, depending on which is dominant. In the first scenario, with a predominant coordinative discourse, we can largely fall back onto problem structuring dynamics as elaborated in earlier sections, because who gets to participate in policy coordination, and how they do so, is strongly influenced by the structure of problems. While less important, a communicative discourse still exists in that scenario. But once an agreement has been reached within such a political system, we would expect that a decision obtains legitimacy because of the (subsystem) actors that have lent support to it. This may especially be the case of semi-structured problems with

of neo-institutionalism. Drawing on work from the cognitive and argumentative turn in political analysis, she argues that discourses – understood as sector-specific policy ideas with a paradigmatic status (e.g. Keynesianism in economic policy) – provide an explanation for why a particular welfare state reform agenda has proven successful, while it failed in another. She contends (e.g. Schmidt, 2002) that the presence of a coherent legitimation discourse – combining substantive elements about problem definition and policy response, as well as normative arguments – may explain successful instances of change.

goal conflicts, where experts, at best, act in a mediating capacity. Either extremely structured or unstructured problems may constitute exceptions. Substantive expert involvement in solving structured problems is largely uncontested and delegation to specialized agencies not uncommon (see also Scharpf, 1997: 153). Conversely, when problems are extremely unstructured, the boundary between the subsystem and the public arena erodes, making a distinction superfluous. It is quite conceivable that scientists acting in a self-authorized capacity gain a voice in that case.

For political systems with strong power concentration and a predominant communicative discourse, such a fall-back onto problem structure dynamics is not possible. Because decisions can be taken by a very small policy elite, there is less need for coordination, which also reduces the appeal of scientific expertise as a symbolic resource. This is not to say that governments in such regimes rely less on scientific expertise. Instead, recourse to expertise, should it occur, takes on a dyadic relationship between principal (government) and agent (expert), rather than a triadic one where a government aims at persuading a third party with reference to expertise, for the third party does not exist to the same extent that it does in systems with more diffuse power. Thus, expertise is likely to be at work under the radar, without seeping into the coordinative discourse.

Expertise may matter for the communicative discourse, however. While governments are authorized through elections, and gain legitimation based on their promised agenda and (anticipated) performance, performance claims require validation through indicators, and the credibility of these benefits from scientific and evidential rhetoric (Topf, 1993). Further, systems of limited political participation have to substitute a legitimacy deficit on the input side. Elections and authoritative performance claims are important, but not always sufficient. Here, the mobilization of scientific expertise in public discourse may be construed as such a substitute. As current debate about public participation in science (e.g. Bucchi, 2009; Callon et al., 2009), and historical research on the relationship between liberal democracies and modern science (Ezrahi, 1990), suggest, science is instrumental in justifying a regime of limited participation (i.e. representative democracy) in and of itself. Evoking science in political discourse, and therefore portraying one's programs and actions as rationally grounded, functions as a rhetorical device to assert that politi-

cal action serves the common good, and is not arbitrary. The evidence-based policy movement of the Blair labour government in the UK is a prime example of such rhetoric (Boswell, 2009: 248).

As it stands, the consideration of political systems with strong power concentration is not exhaustive and would require more clarification in order to be made useful for research purposes.[11] This is of lesser relevance for the present research. Its empirical focus is on Switzerland, which is a known case of a country with many veto players in the policy process. Consequently, theory building focuses on cases with dispersed power. Nevertheless, the present expansion of the theory beyond the policy subsystem is relevant. Even political systems with dispersed power have a communicative discourse, which raises the question about the public role of scientific experts and expertise. Moreover, by arguing that systems with strong power concentration display different dynamics of expertise mobilization, clear limits to the theory's scope can be identified. This becomes relevant when discussing the generalizability of the empirical findings.

Three clarifications

The combination of issue dynamics and the institutional distribution of power affords the construction of a contextual theory of expertise mobilization. For the sake of coherence, the foregoing sections have elaborated the individual steps of this theory by narrowly attending to elements that are endogenous to its dynamics alone. Exogenous elements and objections must now be considered. These concern science policy as a particular context, power politics as antithesis to cogitation, and ideology as substitute for scientific expertise.

Scientific exceptionalism

There is always an odd case that refuses to fit neatly designed typologies. In our case the domain of science policy is one of them. As with any other issue, science policies are not endowed with an intrinsic problem structure. For instance, research funding and the regulation of risks associated with genetically modified organisms

[11] Boswell (2009) and Topf (1993), both discussed in section 2.5, build on the UK case and constitute therefore possible avenues for reflection.

as issues of governance are utterly different beasts, with very different policy politics. The exceptionalism comes about because in policy subsystems that deal with science governance issues, scientists are *de facto* members because they constitute the target group. Scientists as a target group generally benefit from a positive and powerful framing (cf. Ingram et al., 2007), which empowers them as policy participants. Moreover, scientists are dominant participants in science policy decision-making because there is a strong self-regulatory tradition in the governance of science (Braun, 2006; Wilholt and Glimell, 2011).

However, participating in policy formulation as a stakeholder is different to proffering advice from a disinterested position. Scientists may well provide advice in the form of informed accounts of academic practice, but such advice is grounded in experience and not analysis. The scientist's role is therefore more similar to that of a banking CEO whose counsel is solicited in the case of financial market regulation reform. This is not to say that there is no scientific expertise about science that is grounded in the systematic analysis of science. Science studies and its subfields clearly constitute a source of such expertise. Moreover, science governance instruments such as technology assessment aim to produce systematic rather than experience-based evidence. Theoretical reasoning may lead to the conclusion that the valuation and mobilization of such analysis-based expertise follows normal problem-related dynamics, as discussed above. In practice, however, this is highly doubtful, given that the roles of stakeholder and (meta) expert readily become muddled. Other policy participants are unlikely to distinguish consistently between these two roles. Moreover, scientists sometimes forget that practicing scientific inquiry does not make them an expert in all things scientific.

Puzzling and powering

The preceding discussion of problem perception and expertise mobilization did not identify an interaction constellation in which policy politics is focused exclusively on coercion and power. Here is why. Policy formulation may be construed through two seemingly antagonistic modes of interaction. There is the search for the better solution through reasoning and deliberation, also described as cogitation or puzzling. Opposed to this is problem solving through the mobilization of support by

means of coercion and incentives. This has been described as interaction or powering. In communicative terms, these two modes carry the labels of arguing and bargaining, respectively (Holzinger, 2010; Saretzki, 1996). While the association between arguing and scientific expertise is intuitive – after all, both seem to rationalize problem solving – bargaining and negotiation seem at odds with a rationalization finality. As a consequence, there seems to be little use for scientific expertise when policymaking mainly revolves around bargaining and deal making (e.g. Braun, 1998). Yet cogitation and interaction are not mutually exclusive. This may only seem to be the case in Lowi (1972) and his coupling of redistributive policy with negotiation, bargaining and log rolling politics. There, a particular way that interests become affected is coupled, in a more or less deterministic fashion, to a set behavioral response. Yet the earlier definition of the concept of *interaction orientation* (cf. section 3.2) clearly refutes a deterministic linkage by effectively decoupling actor constellations and modes of interactions. Actors caught in the zero sum game typical of redistributive politics have a *choice* in how to respond to it. Depending on whether they care about how other actors fare, such a game may well be played in an antagonistic or cooperative fashion (Scharpf, 1997: 72ff.). It is exactly this observation that Braun (1998, 2009) leverages when he argues that, when problems of redistribution are approached in a cooperative spirit, bargaining and negotiation may be substituted by 'puzzling' as a mode of interaction. Consequently, there are reasons to argue that problems are not deterministically paired with a set mode of interaction. While there is a decoupling of problems from modes of interaction because the latter are mediated by (inter)actor orientations, puzzling and powering as modes of interaction are actually mutually dependent on each other in policy problem solving. Hoppe (2010: 258) writes:

> "No policy comes about without reason and deliberation on the one hand, and instigation or power on the other; but the nature of their being necessary is very different. For their adoption and implementation, even high-quality policy designs remain vitally dependent on successful instigation and decision making. Nevertheless, designs soon hit upon insuperable limits to rationality, irrespective of whether they were reasoned out with or without much sophistication, and with or without extensive deliberation processes. On the way to collective action, these limits can only be overcome by falling back on instigations and decisions."

Thus, it is unreasonable to assume that a given policy problem should induce a single and deterministic mode of resolution. It is rather to be expected that as problem processing goes on, alterations of puzzling and powering take place. Scientific expertise is not a prerequisite for puzzling, which may just as well draw on citizen deliberation. But as Manin (1987) noted, even deliberation needs to end in a decision, for which a majority decision is inevitable.

On ideology as alternative to scientific expertise

The preceding discussion on issue classification was based on the premise that problem framing is an activity that is always grounded in a particular perspective, but it did not address whether different actors are predisposed to different perspectives. In other words, can we treat a civil servant in the same way that we treat a member of a political party elected to Parliament? This question raises the question of whether some actors, e.g. politicians, may be predisposed to draw on ideology rather than science in the production of authoritative statements regarding *is* or *could be* questions.

The contention that ideology may serve as a substitute for science for politicians must be addressed by considering scientific expertise in its two capacities, as information and as symbol. If scientific expertise were reducible to its informational content alone, then its purpose would be to diminish uncertainty regarding the causes and consequences of perceived policy problems. But such informational uncertainty can also be reduced through alternatives such as experience-based intuition (cf. Lindblom and Cohen, 1979), frames (cf. Rein and Schön, 2002), and political ideology. Ideology and common sense are, arguably, the least costly uncertainty absorption heuristics, with professional experience and scientific expertise being on the costly end of the spectrum. Hence, which of these heuristics an actor prefers is a function of his or her available cognitive and organizational resources.

But the problem is more complex than this assessment might suggest. As established, individuals primarily participate in policy formulation in a professional, not private, capacity (Scharpf 1997: Chap. 3; see also Fischer 2012: 55-7). As part of a composite actor, their action orientation reflects the values and perceptions of the social collective they are a member of. This is not only relevant in terms of action

but for cognition, too. Information processing is carried out collectively, possibly involving a division of labor. Pooling information processing capacity in such a way affords the possibility of accessing more costly and sophisticated uncertainty absorption heuristics, which are not available to isolated individuals.

Further, *is* claims require justification. Science, experience, common sense and ideology are different registers of justifying empirical beliefs. Justification requires reference to a third party in front of an audience (Saretzki, 1996). This makes the choice of register of justification dependent on the audience's preference. In Western countries the general public is receptive to scientific arguments as a register of justification. But this does not make science the default mode of justification. Particular groups may be distrustful of science because of misconduct, collusion with the ruling elite, or because scientific pronouncements run counter to personal experience. It is thus conceivable that a politician addressing a populist movement appeals to common sense and ideology, rather than to science. However, in order to reach a broader audience and make claims about the common good, science has to be reckoned with. The anthropogenic cause of climate change, for instance, is not simply denied on the basis of ideology and experience; rather, such denial requires the undermining of the credibility of scientific truth claims (cf. Oreskes and Conway, 2010).

When drawing together the individual cost of an uncertainty reduction heuristic, the fact that cognition and information processing are collective processes in policy formulation, and the need of affirmation of a truth claim by an audience, the attribution of science or ideology as a default tool for uncertainty reduction and justification of claims to a particular group of actors appears problematic. A politician may well mobilize ideological beliefs when talking at a party convention, where participants subscribe to the same values. But when trying to reach an audience wider than members of that political party, he or she is likely to appeal to values that are shared by the wider community. Mobilizing scientific arguments could be exactly the right instrument for such a task.

In connection with the problem structure typology, it is plausible that unstructured problems engender situations where ideology is likely to substitute science as the dominant justification heuristic. Not only are epistemic claims contested in

such a context, there is also a lack of a stable audience that could witness and attest claims made in the name of science.

3.5 Effects of scientific expertise

Having established a model of expertise mobilization in response to the question of which situations will cause participants in policy formulation to draw on scientific expertise, we can now turn our attention to the second research question: what consequences does scientific expertise engender when it becomes part of the policy process? The literature review has established two kinds of effects of scientific expertise (cf. section 2.6). Firstly, scientific expertise may have cognitive consequences in informing policy design or shaping how policy participants conceive of a problem. Secondly, there are social consequences. Expertise mobilization may have effects on social interaction (i.e. policy politics) by enabling social coordination through procedures of conflict containment, or by exacerbating conflict when political conflict is mirrored by public scientific disagreement. In addition, social arrangements for evidence production may effectively institutionalize a problem definition, even if the problem fails to become part of the political agenda.

Political interaction dynamics engendered by problem structures, as explored earlier, may not only account for expertise mobilization dynamics. In fact, such policy politics dynamics may also account for what kind of consequences (i.e. cognitive or social) expertise may engender. However, there are a number of issues to be considered before this argument can be laid out. Firstly, dynamics of expertise mobilization and the consequences thereof are not independent of each other. Without the mobilization of expertise, the latter cannot engender consequences. Moreover, consequences may feed back – or rather feed forward – into mobilization dynamics, as the mobilization of expertise potentially transforms conflict structures, which in turn may shape political dynamics in the future, which themselves become susceptible to expertise mobilization. Secondly, expertise mobilization decisions are motivated by the perception and anticipation of a particular issue structure. There is the possibility that such perceptions will prove mistaken at a later point. However, by the time such a 'reality check' becomes possible, experts have long been

mandated or ignored. Consequently, it is not the objective reality of a situation, but its subjective construction, that matters for mobilization decisions. But the *real* and not the subjectively construed situation matters for the consequences that mobilized expertise engenders in the policy process, as expertise begins to interact with other participants in policy formulation. This is akin to the observation that, while the perception of situations activates action orientations, the real situation influences whether the anticipated action will be successful (Mayntz and Scharpf, 1995: 60). This is congruent with the third point: unlike a decision to mobilize expertise, the consequence of such a decision is not necessarily the product of intended and controllable agency. There might be consequences that are unintended or of which policy participants are unaware. The reason for this is that expertise acts in concert with other factors (cf. Owens, 2011; Radaelli, 1995). The social context of policy formulation is always already impregnated with formal and informal institutional rules and practices, which mediate the political dynamics caused by problem structures. These institutional rules favor inertia in information processing (cf. Jones and Baumgartner, 1991; Baumgartner and Jones, 2009; True et al., 2007), which may engender a discrepancy between a situation perception and the social structures in place (that is, path dependency). If we add up the potentially circular causality between conditions of expertise mobilization and its consequences, and of the mediating effects of already existing structures, then the consequences of expertise mobilization are probably best characterized as a web of entanglements wherein expertise is always a necessary but never a sufficient component. Thus, the consequences of expertise mobilization are not steerable by deliberate and intentional agency on the part of any single actor. With these qualifications about causality and agency in place, we may now turn to the link between problem structures and the consequences of expertise mobilization. This link consists of the regulating effect of problem structures on participation in policy formulation; we must not forget, then, that path-dependent institutional factors interact with such dynamics. (Any cause and effect statement therefore depends on an 'all things being equal' assumption.)

Structured problems have limited participation. This reduces the need for majority building through persuasion. It also entails that there is a single principal for expertise mobilization. The consequence of this is that the principal and addressee

of expertise are identical. Because expertise mobilization is costly – for actors who wield the necessary resources as much as others – it has to result in something that the principal desires. Given that the principal also constitutes the audience, there is no need to deploy expertise for coordinative purposes unless the actor that mobilizes it consists of a large number of coalition members. Thus, the primary purpose of expertise mobilization may be policy design oriented information and advice. Because very structured problems are by definition not contested, there is little reason to assume that policies addressing such problems acquire widespread visibility on the political agenda. Therefore, the need for an elaborate communicative discourse is low, which simultaneously reduces the need to draw on science's epistemic authority. Unstructured problems, in contrast, engender unrestricted participation, which may completely erode the subsystem/public arena distinction. In this unfettered pluralism, a scientific expert who dares to join the turmoil is just another participant. Such an expert will mostly be a losing voice in the competition with ideology, for she lacks a political constituency, and no stable coalition exists to serve as an interlocutor/audience. Direct and unmediated material contribution to a policy solution are unlikely effects of such expert participation. As in a game of chance, expert arguments may or may not find an interested ear. But being picked up by a principal with an agenda is still a far cry from exerting a mediating effect on politics. Besides, what academic expert wants to become enrolled in an openly partisan argument?

Regarding semi-structured problems, we established earlier that a trusted expert may act in a mediating role in situations of conflicting goals and values. Such mediation, should it occur, takes place between subsystem participants and produces social coordination. But an expert-*cum*-mediator is not a public role, for settlements of value controversies have to be legitimated by democratic procedural norms. Semi-structured problems with disagreement about the relevant knowledge produce the largest array of expert roles and consequences. Depending on the dynamics between the oligopolistic coalitions, experts may either assume the position of an analyst or, when conflict increases, of an advocate. Within the subsystem, this may engender effects on policy (design input/learning), but also on politics. Because experts mirror (and sometimes animate) political dynamics, their

participation may exacerbate or reduce conflicts. Expertise that becomes part of the public arena likely assumes an advocacy role, which, given public visibility, has an expansive effect on conflict.

Having established these basic dynamics between expertise mobilization and its consequences, a final issue can also be addressed. The participation of experts in policy formulation is sometimes construed as limiting the participation of (lay) stakeholders who lack technical expertise. Nothing in the discussion so far contradicts the assumption that not commanding such capabilities is a disadvantage in staking one's claim. Indeed, I have argued that the resources necessary for expertise mobilization are unequally distributed. Yet we also need to consider that what drives expertise mobilization and the roles that experts can enact in policy and politics are the result of problem structures that also engender more general opportunity structures for participation. Experts do not, and in fact cannot, eject others from the policy arena. Yet their advice seems to be most treasured in cases where participation is most limited.

3.6 Some propositions

By drawing on actor-centered institutionalism, problem governance theory, and discursive institutionalism, this chapter has established a conceptual and theoretical foundation for explaining expertise mobilization and the consequences thereof within policy formulation. I will now concisely restate the ontological assumptions that underly the theoretical model, before detailing the empirically verifiable propositions this model affords.

The ontological assumptions form – to borrow from Imre Lakatos' terminology (Lakatos, 1970) – the *hard core* of the theory, which it critically depends on, but which are outside the scope of empirical substantiation. The first and most central assumption is that policymakers construe scientific expertise as a resource that they can mobilize in the actualization of their idiosyncratic action orientations. Action situations offer constraints and opportunities, and therefore determine whether scientific expertise is perceived to constitute a useful resource. This is followed by a second assumption, according to which access to scientific expertise requires or-

ganizational, financial, and cognitive resources. The third assumption states that scientific expertise has the two intrinsic and non-alienable properties of having an informational core, and of symbolizing the trust society places in the social arrangements that have produced it. It is both plausible and very likely that particular situations give prominence to only one of these attributes, with the other being latent, but not absent. It is interactional dynamics – not the intention of a single actor! – that modulates which aspect attains prominence.

With these assumptions in place, we may proceed with the synthetic presentation of the empirically verifiable propositions. In accordance with the assumption that expertise requires resources for it to be mobilized, theory development supposes that such resources are unequally distributed in a political system, with a strong bias toward the state. The population size of a country may reduce this bias by affecting the supply and demand of expertise. Concerning supply, the larger a country, the more numerous the supply of potential experts, assuming the percentage of the population with academic training to be fixed. Because of economies of scale, the number of policy problems does not grow with population size through a linear relationship, increasing the pool of potential experts per issue. Population size affects expertise demand through the possibility of pooling the resources necessary to acquire expertise. For instance, an environmental interest group with 1 million members has more financial capacity than one with only 50 thousand. Hence, the propensity of expertise pluralism increases with population size. In small countries, the smaller domestic expert pool per issue can only be mitigated through expertise from abroad, which might not always be suitable, or by substituting scientific expertise for less costly uncertainty absorption heuristics, such as experience. However, the demand structure can be influenced. The state can subsidize select groups (e.g. public financing of political parties) and thereby increase their resource potential. Moreover, it can empower producers of expertise by granting non-earmarked funding and providing a constitutionally secured access to the political system (i.e. the Dutch solution).

Resource distribution is not sufficient to characterize an advisory system. Scientific expertise is valued above experience, common sense and ideology because Western societies have come to trust members of the scientific community, its in-

stitutions, and methods as enabling disinterested and objective representations of the world. Suggesting that one's argument is grounded in scientific evidence is an attempt to convert trust in science into society trusting oneself. Yet science–society trust relations are not generic, since they are the product of idiosyncratic national historical trajectories. Consequently, a national system of expertise does not only depend on who commands expertise, but also on procedures of deployment that are culturally recognized as legitimate.

Expertise control and epistemic culture jointly provide a model of *who* may mobilize expertise, under observance of *which* procedural constraints, but they do not provide insight into in which kinds of situations expertise is perceived as valuable and as instrumentally effective in the realization of action orientations. The latter may be explained by looking at action situations. As a brief reminder, action situations are modeled around issues and audiences. Issues have a normative and an epistemic core, and agreement and disagreement about these engenders different issue structures. Political decision-makers are confronted with the subsystem and the public as two audiences, before whom policies must attain legitimacy. While every political system has both of these audiences, the public becomes the key audience for seeking legitimacy in political systems which enable a small number of actors to take decisions due to power concentration. Conversely, when power is dispersed, gaining the approval of other policy subsystem participants becomes necessary in order to build majorities. Political agreement in the subsystem then becomes the basis of legitimation in the public arena.

The perception of different types of problems engenders different valuations of scientific expertise as an action resource, but it is in interaction with different network structures resulting from a given problem structure that mobilized expertise engenders consequences (cf. Table 3.1). This theoretical development yields several propositions:

1. Highly structured issues are firmly rooted within a policy subsystem, which is dominated by a single coalition. Expertise mobilization occurs only when the administration lacks the required technical capacity. The mandating agency and the audience are thus one and the same. Mandated experts operate in the shadow of public attention and do not appear in the communicative dis-

course. Such expertise mobilization affects policy design by producing concrete instruments and concepts.

2. Semi-structured problems with uncertain knowledge are conducive to expertise mobilization. Experts become enrolled in advocacy coalitions, and, depending on the interactional dynamics, they may either contribute to problem solving as analysts or replicate and reinforce political conflict as advocates. The two are not mutually exclusive, but, when carried into the public realm, the advocacy role is likely to dominate.
3. Moderately structured issues with disagreement about values are not conducive to expertise mobilization, but a highly trusted expert or venues of advice production may be enlisted as part of a conflict containment and mediation strategy. Possible consequences from such (rare) expert involvement are entirely of an interactional nature, by brokering an agreement. Such expert involvement is likely confined to the subsystem, as it exactly serves the purpose of removing an issue from the public spotlight. A policy decision obtained under such conditions is likely legitimated in public by reference to the support it obtained from contesting political parties.
4. Unstructured issues obliterate the subsystem/public distinction. With no stable adversary to persuade, and no prospects of finding a shared goal, scientific expertise is of little instrumental value. But the absence of entry barriers makes it possible for self-authorized experts or institutionalized advisory bodies with a foresight mission to join the fray. But this makes them one of many participants, without an *a priori* higher epistemic authority. They may name problems, and thereby give structure to the debate, but neither conflict mitigation nor substantial policy design are likely to be immediate consequences of this.

These propositions mark the end of this chapter. The next chapter turns to methodology in order to elaborate how these propositions may be empirically substantiated.

Table 3.1: Expert roles and their consequences in different issue configurations.

			Problem structure			
Dispersed power			*Structured*	*Uncertain knowledge*	*Conflicting goals*	*Unstructured*
	*	*Expert role*	Engineer	Analyst; advocate	Mediator	Participant
		Effect on	Policy	Policy/politics	Politics	Politics
	†	*Expert role*	-	Advocate	-	"
		Effect on	-	Politics	-	"
	*	Subsystem arena				
	†	Public arena				

Four

Empirical Approach

4.1 Introduction

Assumptions made about a phenomenon's ontology substantially shape inquiry design and the methods to be deployed. Researchers working within an interpretive paradigm have therefore called for theory–method congruence. Clarke and Leigh Star (2008) speak of a *theory–methods* package to describe the interconnection between ontology and methodology, even though, for them, this is about 'grounding' theory in the data through the use of methods, and not about 'causal inference'. Determining which methodology to adopt is thus not simply a 'pick and mix' operation based on the preferences, affinities, and skills of the researcher.

Ontologically, this research assumes that scientific expertise is constituted by *deliberate* social action, and that such action is itself the product of situations. The latter are composed of both material and immaterial elements (resources, actors, rules) *and* the subjective meaning that actors attribute to them. These assumptions follow in part from the literature review, as well as from the actor-centered institutionalism framework adopted as the basic ontological infrastructure for theory building. In order to make them operational for empirical analysis, I pursue a double strategy. In a first step, I develop a descriptive account of the institutional dimensions of scientific expertise within the Swiss federal decision-making process. In accordance with the theoretical propositions already developed, the aim is to clarify the organizational structure of expertise production, the distribution of access to it, and the extent to which a coordinative rather than communicative discourse prevails in decision-making. These elements constitute the backbone of a tentative advisory system typology which reaches well beyond the classification of

organizational traits of institutionalized producers of scientific expertise. In a second analytical step I take the opposite perspective. Having clarified the 'objective' distribution of expertise, it is now necessary to consider how the subjectively construed realities of political action situations condition the mobilization of scientific expertise and the consequences thereof. For that purpose I analyze policy formulation and expertise mobilization in three different decision-making processes. These are selected such that each matches a different type within the policy issue classification elaborated in the preceding chapter. Contrasting these cases not only allows for verification of whether observed patterns of expertise mobilization and its consequences conform to the theoretical expectations postulated for each policy type, but also allows for discrimination between effects induced by the political system and those by policy issue dynamics. Analytically, this latter task entails the reconstruction of the selected decision-making processes. In order to causally connect context to action, this reconstruction focuses on the perspectives of those actors who mobilized scientific expertise. Here I draw on the *situational analysis* framework developed by Adele Clarke (2003, 2005), which offers a set of ontological assumptions as well as analytical techniques for 'opening up' a dataset. With roots in grounded theory and symbolic interactionism, situational analysis is a relatively open analytical framework for analyzing interactions between collective actors in shared arenas.[1] While explicit about its sociological assumptions, its analytical techniques are exactly geared to capturing the interpretive flexibility with which social actors approach a given action situation.

The remainder of this chapter elaborates the research design of this study and describes data collection. It ends with an explanation of the analytical strategy, including an analytical hierarchy that ranges from data processing to interpretation.

4.2 Research design

This study employs a case study design (George and Bennett, 2005; Gerring, 2007; Yin, 2009). Such a research design aims at in-depth analysis of a single or very

[1] While its theoretical roots differ from those of actor-centered institutionalism, situational analysis is quite compatible with the latter as far as the analytical level of action situations is concerned. I will argue this point further below.

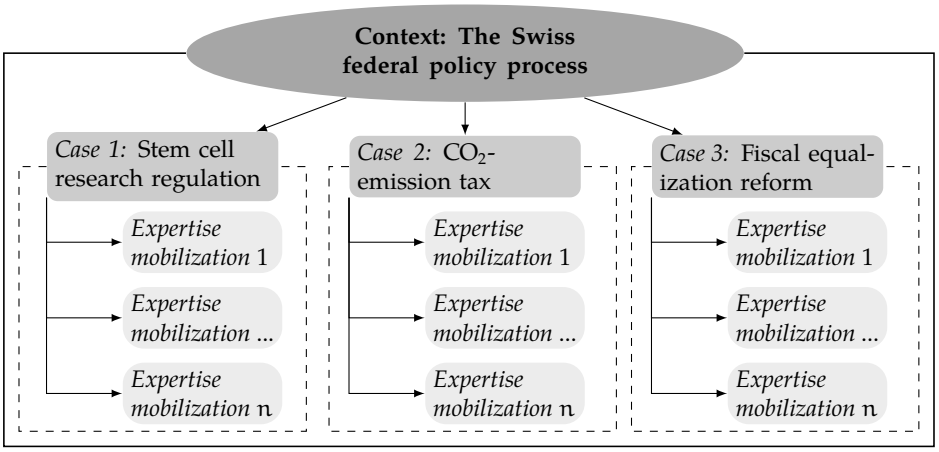

Figure 4.1: The research design. *Source:* author's illustration.

limited number of occurrences of the phenomenon of interest. It is an appropriate design choice for investigating *how* and *why* questions about relatively contemporary events over which the investigator has no control (Yin, 2009: 8ff.). Moreover, it allows for context sensitivity in the analysis, enables a focus on social processes whose sequences may not be captured by standardized measures, and permits the necessary flexibility for alternating between theory and data in the analysis process.

To be precise, I adopt an 'embedded multiple case design' (Yin, 2009: 46ff.). This means that I analyze several cases (decision-making processes) that share a common context (the Swiss political system, 1990–2005), which jointly exercise an influence on sub-units embedded within a single case (the mobilization of scientific expertise). This study defines the case unit as a decision-making process, which comprises a substantive issue and a set of (in)formal rules that govern where, how and who deals with it. Furthermore, the study takes expertise mobilization events to constitute the embedded sub-units. A hierarchical ordering of the research design is important because I explicitly study policy advice in the context of policy-making. This implies a clear dependency between case and sub-unit, because the former brings the latter into being and not the other way around. Case selection has to operate based on the characteristics of the decision-making process, and not on the instances of policy advice embedded therein.

The research design (Figure 4.1) has three layers. The outer layer is the institutional configuration of the political system at a given historical moment. This in-

fluences the organization of policy-making (Papadopoulos, 1997: Chap. 8). It may also have a direct influence on the occurrence and organization of policy advice. Embedded within this context are the cases, which are the second layer in the design – the discrete policy-making processes. As with the political system as a whole, they also exert a possible influence upon the occurrence and structure of individual instances of policy advice. At the core of each case are particular instances of policy advice. These are neither sufficient nor *necessary* conditions for policy-making, which may well take place without advice. Therefore, where and how often they occur is *a priori* unknown.

Cases and unit of analysis

The definition of cases requires justification (Gläser and Laudel, 2010: 96). In public policy research policy-making processes are frequently defined as the case unit. Such a practice is appropriate for this study, too. A policy-making process provides a coherent delimitation of purposeful social action. It is an empirical rather than conceptual category for it is generated *in situ* and its structure is meaningful to its participants. These participants shape their actions in reference to events and other participants inside the decision-making process. This leads to the emergence of an action system which is clearly distinguishable from public action in relation to other policy issues. Thus, a decision-making process is an 'organic' unit and the fact that it is structured by institutional rules and norms ensures a certain unit homogeneity. Thus, while one process might considerably differ from another one, it still shares enough similarity to provide comparable social action contexts.

The cases are also bounded in time. For the purpose of this research, they end with a parliamentary decision or a popular vote. Such decisions not only mark the potential beginning of policy implementation, which is a different context from policy formulation, but are also important points of reference for the participant actors who develop their strategies in reference to them. The exact beginning of a case is more fuzzy. A rough definition of a case's inception is the emergence of sustained institutionalized attention to an issue. Every issue has a prehistory and none materializes out of thin air. The extreme historical boundary of a case overlaps with the temporal scope of collective awareness at the moment of the first official

act in relation to a specific policy issue. This case definition makes also clear that the level of analysis is situated at the meso-level of social interaction in an organizational setting. It encompasses all the directly relevant social interactions concerned with policy advice.

While adopting a policy-making process as a case unit is a tried and tested analytical strategy, no such thing can be said about policy advice – the embedded units in the research design. Different instances of policy advice might display important organizational variations, but they have several elements in common which enable their clear identification and bounding. Firstly, science-based policy advice involves people who produce and disseminate advice (advisory organizations, individual experts). Moreover, it necessarily contains a cognitive object (e.g. an idea, a fact, a theory, etc.) encoded in a material object (advisory report, leaflet, powerpoint presentation, etc.). Often, but not necessarily so, advice is given in face-to-face interactions (an event, a hearing, a press conference), to which reference might be made in subsequent policy deliberation. Secondly, the production of advice requires purposeful and deliberate social action. Actors producing, giving and receiving advice deliberately do so and are thus aware of the procedural steps and symbolic dimension associated to it. Hence, delimitation of an instance of science-based policy advice is possible through tying a cognitive object to the actors and interactional situations implicated in its production, negotiation, and consumption.

Comparative logic

Comparing different cases allows for testing whether or not the case level exerts no influence at all, mediates institutional effects of the political system in a particular way, or engenders purely case-specific dynamics. Clear differences in the manifestation and consequences of scientific expertise would suggest that a particular policy issue engenders either an independent effect or mediates a system-level effect in a particular way. However, should the analysis reveal consistent similarities across the different cases, it would be likely that the context – the political system and its culture – exerts a direct influence rather than the specific case itself.

In order to allow for comparability of the different cases, some factors must be held constant. For the context, only cases embedded within the Swiss federal

decision-making process are considered. More tricky is the bounding of the temporal context (Pierson, 2004: 169ff.). For this study, it requires consideration of the political as well as the scientific system. Political and scientific systems are not frozen, they change with time, even though some do so at a very slow pace. Given that we have entered a new configuration of the science–politics relationship since the 1980s (Guston, 2000), there are empirical reasons for looking at post–1980 cases. Moreover, it also places the cases within the temporal scope of the case study framework (Yin, 2009: 8). A case as defined in section 4.2 must have come to a close before being analyzed. Only an accomplished process can be reconstructed in its entirety. Thus, selecting cases prior to 2005 is a sensible choice.

Case selection

This research treats a law-making process as a case. Case selection consequently entails determining which law-making processes to analyze: this is a methodological choice, and must reflect ontological assumptions stipulated by theory. A decision-making process revolves around a substantive issue, which is affected by a particular conflict structure. The latter in turn establishes a particular action situation, to which policymakers are sensitive in their action strategies. Following this logical deduction means treating action situations as cases if, and only if, one condition is met: an issue structure must remain stable throughout a decision-making process. It is possible that issue structures change over time, which may occur at a very slow pace or in the form of a shock event. But it is equally conceivable that – in analogy to policy subsystems (cf. Sabatier and Weible, 2007) – issue structures remain fairly stable over a decade or so. Proving stability is ultimately an empirical task. Should changes in issue structure emerge, then a single decision-making process has to be treated as more than a single case.

We may therefore proceed with case selection by mapping decision-making onto the issue structure typology. Again, clarification is needed. Issue structures are subjectively construed, which allows for the possibility that different actors develop different perceptions of a situation. But because policymakers are sensitive to how other actors perceive a situation, it is likely that different perspectives converge and become congruent (cf. section 3.4). This bridge between the subjectively perceived

world and the emergence of a intersubjective social reality also helps to span the gap between the situated perspective of the agents *in situ* and the outsider perspective of the researcher (with case selection ultimately driven by the latter). As case selection takes place before conclusive knowledge about the issue structure of each selected decision-making process can be obtained, I relied on a brief analysis of each case's inception and the federal government's initial strategic response. The case study results later corroborated these initial assessments.

An assumption of the stability of issue structures and their intersubjective nature consequently allows for case selection according to variability in issue structure. In order to ensure that the variation between issue structures accounts for the expected differences in expertise mobilization, the cases must be independent from one another. They have to reflect substantially different issues, implicating different policy subsystems and potentially mobilizing different kinds of substantive expertise (the latter point is of particular interest, as the academic literature tends to study *either* natural or social scientific expertise, but seldom contrasting them). Moreover, path dependency effects should be minimized by selecting cases without a direct substantive predecessor (i.e. the revision of an existing law).

The three cases selected – stem cell research regulation, carbon dioxide emission taxation, and fiscal equalization reform – satisfy these criteria of independence. Each concerns a substantively different problem and brought together a different cast of participants in policy formulation, who, for the most part, called on producers of expertise not involved in the other cases.

These cases represent a relatively unstructured issue (stem cell research regulation), a semi-structured issue with epistemic consensus (CO_2 emission taxation), and a semi-structured issue with value consensus (fiscal equalization reform). A purely structured case is not included, because it is less likely that such an issue becomes the subject of a decision-making process with substantial intervention of external experts. The unstructured nature of the stem cell case is relatively straightforward as it involves a divisive value question, given the necessary destruction of a human embryo in order to extract stem cells from it. Moreover, at the time of the issue there was substantial debate, within scientific and lay communities (cf. Vogel, 2001), as to whether equivalent insights could not be gained from us-

ing other kinds of stem cells. The identification of the CO_2 emission reduction case as a semi-structured issue, incorporating disagreements about values, is grounded in the government's perception of the feasibility of legislation, based on a policy brief dating from summer 1990. It explicitly mentions a major international conference on climate change, which would take place in the fall of the same year, while simultaneously anticipating the ecology/economy goal conflict any measure would entail. Finally, the classification of the fiscal equalization reform as semi-structured, with conflicts around knowledge, is justified by the analysis of Braun (2009), who demonstrates the importance of how actors dealt with uncertainty for the reform's successful accomplishment.

4.3 Data collection

The aim of data collection is to establish an exhaustive account of the organization of scientific expertise in the Swiss decision-making process, as well as of the three decision-making processes further examined in detail. Hence, data collection does not pursue the goal of providing measurements for a few conceptualized indicators. Rather, it strives for a 'thick' account of events and processes in order to test the theoretical propositions.

The data consists of 42 semi-structured interviews and several thousand pages of documentary records. It allows a general characterization of the Swiss advisory system and for detailed reconstruction of the three decision-making processes under study. Moreover, the fact that this study employs interview testimony as original data in connection with archival records affords a comprehensive triangulation of sources. As scientific expertise is enacted in a professional context, we may construe it as a routinized activity whose organization is neither arbitrary nor accidental. The interviewees were selected because of they have executed or witnessed such routines themselves. The interviews were then designed to capture the participants' knowledge of such organizational routines and particular events. Interview testimony can be cross-validated for consistency and may be aggregated into a multi-perspective account. Precisely because policy formulation and scientific expertise are formal and professional processes, they produce an extensive paper trail

(Freeman and Maybin, 2011). I was able to access and analyze much of this material. Beyond its own informational value, it played a significant role in the preparation and validation of interviews. It was through this documentation that I gained the necessary background knowledge to select appropriate interviewees, formulate relevant questions and further probe tacit answers. Documentary sources also enabled me to judge the plausibility of an account and to detect memory bias. Conversely, interviews complement documents. Despite the importance of meeting minutes and reports for organizational life, not everything is recorded or accessible. This especially concerns informal meetings and tacit knowledge. Interviews were helpful in reconstructing informal action and in providing insights were written documentation was off-limits.

Documents

This study exploits four different kinds of documentary sources. The first kind consist in documents that articulate ideas in connection with policy formulation such as draft policy proposals, white papers and advisory reports. Drafting such documents is the core task of policy work. The second kind encompasses documents whose aim is to coordinate strategy and policy work. Typical exemplars are memos, meeting minutes, letters, guidelines, and polls concerning stakeholder and public opinion preferences. These first two kinds are usually produced or mandated by government. The third kind, however, is composed of documents that reflect an outside perspective on the policy issue and its process. Newspaper articles are the most important item in this category. They do more than report about issues and events. Newspaper accounts shape a perspective that may engender a reaction by the policymakers who read them. A newspaper is a platform where certain aspects of the policy process may be rendered visible to a wider public, and where support and criticism to a policy initiative may be voiced. The final kind of documents are non-recursive accounts of the policy process. Unlike newspaper reports, publications such as scientific journal articles are addressed at publics who are not affected by the policy issue. Moreover, such accounts usually have a greater temporal distance to the events they report on than have newspaper articles.

Because the documentary evidence is heterogeneous and access modalities were

variable, the collection principle I employed was exhaustiveness, arbitrated by the available resources to conduct data collection. The harvesting of newspaper articles constitutes an exception to this rule. I systematically queried a French as well as a German daily newspaper, which are widely read by the political elite (*Neue Zürcher Zeitung* (NZZ) and *le temps*). The following paragraphs provide more information about the data collection process and offer a description of some of the sources.

Most expert reports and position papers by organizations have been easily accessible. Major reports are oftentimes published, either electronically on the website of the administration[2] or in print (for older reports). Such reports are not a homogeneous type of document. Unlike written documents created by government agencies, the life histories of advisory reports and position papers are very unstandardized. This starts with their inception. Some have been commissioned, others have been created on the sole initiative of their author. There might be a clearly identifiable individual author, multiple authors, or institutional authorship where the names of the contributors are sometimes not even printed in the report. Advisory reports also lack a clearly predefined structure and style, leaving much open to the experience of their authors.[3]

As for Parliament, most of its records are publicly accessible on its website.[4] This comprehensive website informs about present and past legislative issues. Parliamentary floor debates are fully transcribed and publicly accessible. However, since the meetings of parliamentary committees are confidential, their minutes are not freely accessible. Nevertheless, all my written requests for access were granted, on condition that I preserve the confidentiality of the meeting participants and did not use verbatim quotes.[5]

Each branch of the federal administration has its own access policy for material authored prior to the 2006 enactment of the Federal Act on Transparency in the Public Administration. Moreover, it also depends on a particular agency how long it keeps the documentation about a certain legislative act in its office prior before com-

[2] `http://www.admin.ch`

[3] Interviewed experts said that they aim to mimic the communication style of leading newspapers like the NZZ or of the dispatch (in which the Federal Council communicates policy proposals) with their advisory reports.

[4] `http://www.parlament.ch`

[5] These minutes are verbatim transcripts created by professional staff. They are revised for readability and random utterances common in spoken language are eliminated.

mitting it to the federal archives. The federal archives impose a 30 year embargo, during which the filing agency has full control over who gets access and with which provisions. This state of affair was not without consequences for this research. Some branches of the federal administration were more generous than others. The Federal Office for the Environment (FOEN) allowed me to digitize its internal archive on carbon emission taxation and provided me with the necessary infrastructure to do so. For material pertaining to the fiscal equalization case study, consulting the federal archives was necessary. While the Federal Office of Justice (FOJ) granted virtually unrestricted access to the material it filed on this case (digitization, no restrictions on quoting), the Federal Finance Administration (FFA) restricted access to its archived files to an 'eyes only' level (no quoting, no digitization, on location notes only). The fact that much of the material archived by FOJ was identical to what FFA filed, made these access policies a bit paradoxical. For the case study on stem cell research, I was unable to access records outside the public domain for the Federal Office of Public Health had not committed its case records yet to the Federal Archives and I lacked the appropriate connections to staff working at the office in question. Nevertheless, the amount of publicly available information and excellent interview data enabled a comprehensive analysis of the case.

Interviews

This study uses interviews as an indirect method of observation of the manifestation of scientific expertise and of policy work. The latter constitute the units of analysis (cf. section 4.2), not the interviewees. Thus, there is a clear ontological difference between the phenomenon of interest and an interviewee (Spencer et al., 2003: 202). This clarification is important as it influences the interview protocol's design and the analysis of the data thus generated.

The methodological framework I employ for the interviews is called 'expert interviews' and has been theorized by mostly German speaking social scientists (cf. Bogner et al., 2009). Such expert interviews are semi-structured and aim at elucidating a functional elite's interpretative and procedural knowledge about an organizational context of interest (Littig, 2009). Interviewees are construed as experts for the analysis because they possess experience-based knowledge about the phe-

nomenon (e.g. organizational routines) the interviewer is interested in. This is not to be confused with members of the functional elite being referred to as experts in the context of the phenomenon. This may cause confusion particularly for this research as I use the 'expert interview' framework to interview people who acted as scientific experts in the policy processes I study. Nevertheless, I am interested in what people know about a process through first hand experience (cf. Meuser and Nagel, 2005: 75), not about what they know about fiscal federalism, biomedical ethics, or atmospheric physics.

Topic guide

Expert interviews follow a semi-structured topic guide. The topic guide is a methodologically reflected document that is consistently used across all interviews. The aim is to let the interviewee provide an account that is as little predetermined by the interviewer as possible, while still retaining enough control to steer the conversation when it gets off-topic, or to offer encouragement to explicitly verbalize the many tacit aspects of organizational life. The latter requires prompting of particular points, especially once the mostly spontaneous initial reply has come to a close.

The topics addressed during an interview concern an interviewee's experiences and judgements in regards to the empirical context of the phenomenon. They should be intuitively comprehensible, clearly relate to the interviewee's experience, and should eschew concept-laden language (Gläser and Laudel, 2010: 112ff.).

Apart from what topics an interview addresses, the interview guide also defines how and when they are talked about. The interviewer's aim is to establish a cooperative atmosphere that is conducive to trust building. In addition to strategies discussed in section B.2, this can be significantly influenced by the topic guide's structure (Arthur and Nazroo, 2003: 114). As trust builds over time of the interaction, the most important design principle is to start the interview with non-contentious topics that are immediately accessible without much reflection and to address more narrow or more delicate issues later on.

Table 4.1 represents an abridged version of this study's topic guide. While following the enunciated design principles, the topic guide reflects the diversity of perspectives the interviewees bring to the task. Thus, some topics are only intelligi-

Table 4.1: Interview topic guide (abridged version).

Topics	P	A	E
Introduction: presentation of interviewer and interview schedule	×	×	×
Professional background and role of interviewee in the decision-making process	×	×	×
Personal and collective preparation process of policy deliberation in Parliament	×		
Organization of policy work during the pre-parliamentary phase		×	
Mobilization and organization of expertise during the pre-parliamentary phase		×	×
Rationales for and organization of expert hearings in parliamentary committees	×	×	×
Deliberation and the role of the administration in parliamentary committees	×	×	
The production process of advisory reports			×
Organization and governance of advisory bodies		×	×
Reception and perception of expert advice in the policy process	×	×	×
Synthesis of key points and conclusion	×	×	×

ble for persons interviewed in their capacity as members of Parliament [P], others apply only to civil servants and members of government [A], and some issues were only relevant to the academic experts [E] I talked to. The relevance of a particular topic to for each of these groups is indicated in the last three columns of the table.

Interviewee selection

The choice of interview sampling is directly linked to the research design and the status of interview data therein. As interview data serves the purpose of reconstructing events of interest in this research and, accordingly, the interviewee does not constitute the unit of analysis, interviewee selection does not strive for representativeness of a particular social group. Rather, the sample design aims at identifying the individuals who have acquired detailed and experience-based knowledge of the events in question by having participated in some of them. Thus, interviewee selection follows the logic of data saturation, which is also influenced by how detailed a reconstruction is possible from archival records alone.

The studied decision- and advisory processes bring together the three distinct, and at times overlapping, perspectives of the executive and legislative branches of government, as well as the one of advisory institutions. The most important principle of interviewee recruitment was to adequately reflect these different perspectives in order to 'have eyes' on as many events and processes as possible, and where possible, to have multiple witnesses to the same situation. Thus, maximal coverage and

data saturation dictated how many persons I interviewed from each viewpoint. The sample design also took into consideration that the parliamentary perspective contains multiple sub-perspectives that reflect the different political parties with their independent opinion formation processes.

Naming of people in documents, the comprehensive recording of attendance in the minutes of parliamentary committee meetings, and referrals from other interviewees constitute the data from which to select interview participants. For MPs this process was straightforward. As the committee meeting minutes are verbatim transcripts with clearly identifiable speech turns, counting and plotting the number of interventions per meeting participant was possible. I then contacted the most vocal MPs of each party, based on the assumptions that those who contribute the most to the debate are likely to be the opinion leader of their respective party, have invested more effort in personal preparation, and are more likely than others to recall events. In conjunction with referrals, the attendance record contained in the parliamentary committee meeting minutes also enabled to identify the civil servants and members of government who drafted the policy proposal and were in charge of that process. Since that is a fairly small group, no particular sampling strategy was necessary. Identifying the individuals and organizations having played an advisory role was less straight forward for lack of a systematic record. Yet, the list of participants in parliamentary hearings, references to advisory reports in governmental records obtained through archival searches, or information obtained through interviews with civil servants managed to produce a coherent picture in the end.

Table 4.2 provides a picture of the final interview sample. A total of 14 persons were interviewed who during the respective policy process were either members of the federal or cantonal executive, or held positions in the federal or (inter)cantonal administration. In the parliamentary venue, 16 interviews were conducted with MPs and one with two secretaries of parliamentary committees. Finally, ten interviews were arranged with academic advisers and staff of advisory organizations. Out of the 43 persons I spoke with during these 41 interviews, 11 were women and three were French speaking. With the exception of two occasions, interviews were with one persona at a time. Only in three instances did an interviewee actively participate in more than one of the processes this study is about. As interviews

were scheduled on a rolling basis, this was neither anticipated nor controlled for. It means, however, that the sample spreads well across different fields of experience and that possible convergence of interview testimony between the different case studies is not an artifact of sample selection.

Table 4.2: Interview attributes.

Number of interviews*	41
By venue:	
Government and administration	14
Parliament	17
Experts and advisory organizations	10
Number of group interviews	2
Number of interviewees	43
Number of French speakers	3
Number of women	11

**A phone inquiry was not counted as an interview.*

4.4 Analytical strategy

As I have previously outlined (cf. section 4.1), the empirical analysis consists of an analytic-descriptive account of what I have termed the institutional dimension of scientific expertise in Switzerland, followed by three case studies that examine scientific expertise in action. The use of situational analysis, further detailed below, presupposes an analytical strategy that works from the ground up and finds integration with theoretical presuppositions in form of sensitizing concepts. This is a generic template that many qualitative and interpretive methodologies share. Spencer et al. (2003: 212ff.) call it an 'analytical hierarchy'. It is a ladder of progressive abstraction that links the raw data across several methodologically controlled steps to a theoretically informed interpretation.

Figure 4.2 illustrates this analytical hierarchy. The first step is data management, which implies several operations. The raw data has to be organized in a structured and easily accessible fashion. This includes operations such as transcribing interviews, digitizing paper records, and tagging all the items with metadata. The second step consists in data reduction, in order for any meaningful analysis to be possible. This reduction process goes hand in hand with an initial sorting process of

the data according to its content. Once this step has been accomplished, the data is structured and labeled in such a way that all evidence relating to a particular situation of action can easily be grouped together for further analysis. The third step consists in the elaboration of a descriptive account concerning each action situation. It is the core of the analytical enterprise. The final step is to write the case narratives and to compare their findings in light of the Swiss institutional context. This analytical hierarchy enables the researcher to move across different levels of abstraction. As new insights inevitably develop during the analysis process, the researcher can move back into the raw data. Also, the analytical hierarchy affords a transparent analytical process with a precise documentation of each step. This also allows for a clear chain of evidence (Yin, 2009: 122).

In what follows, the analytical process is detailed. Beginning with data management and reduction operation, I elucidate the necessary procedure for interview and documentary evidence. The chapter then elaborates on data interpretation and the role of situational analysis therein. It concludes with a list of sensitizing concepts used for interpretation.

Data management and reduction

Data management encompasses the digitization and storage of data, tagging of that data with metadata, and organizing it in a chronological order. A clear storage system is crucial for enabling a clear chain of evidence (Yin, 2009: 122). In order to facilitate this task, I developed a relational database using FileMaker Pro. This database serves also for storing structured information about events and actors relevant to each case.

Interviews and documents are subject to different procedures of data reduction. For the interviews, I draw on an approach developed by Meuser and Nagel (1991, 2005, 2009). This approach offers a number of methodologically controlled steps for the analysis of expert interviews within the framework of a reconstructive analysis. Like other interpretative analytical strategies, it presupposes a ladder of abstraction connecting the raw data on one end with a theoretically informed interpretation of empirically grounded types on the other.[6] The three broad sequences of recon-

[6]See Spencer et al. (2003) and also Kelle and Kluge (2010) for a similar approach.

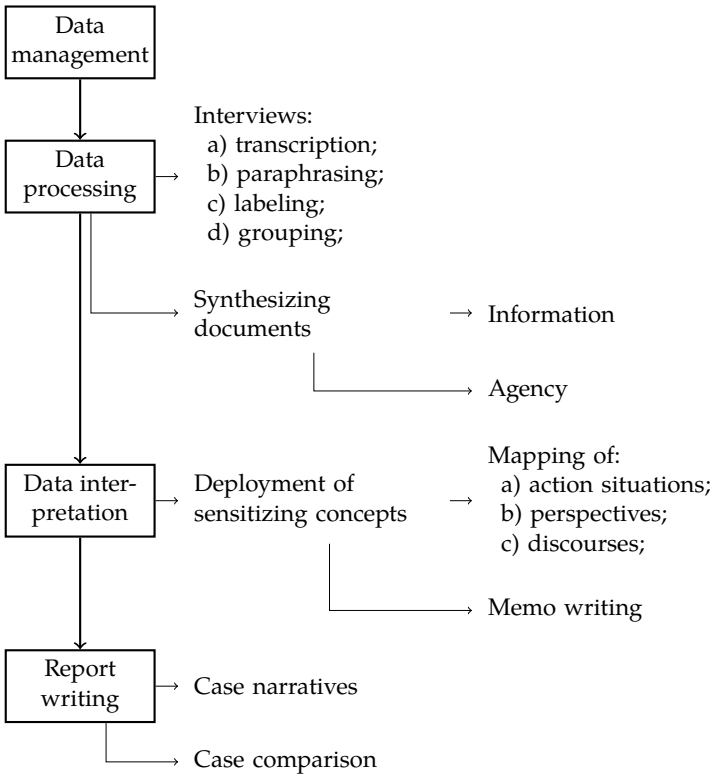

Figure 4.2: Analytical hierarchy. *Source:* author's illustration.

structive qualitative analysis of data management, the development of a descriptive account, and the development of an explanatory account are broken down into six individual steps. They lead the analyst from interview transcription (1), to data reduction through paraphrasing and regrouping of similar passage within one interview (2–3), to the development of a descriptive account by comparing accounts of similar topics across interviews (4), to the theoretically informed interpretation of this reconstruction (5–6). These steps enable the analyst not only to move toward abstraction, but also to make recursive moves in order to verify the empirical grounding of analytical categories (Meuser and Nagel, 2005: 90ff.). This approach is not only fully compatible with the expert interview framework used for data generation – both treat the interviewee as an informant and not as the unit of analysis – it also works well as a substitute to grounded theory data coding techniques otherwise used as precursor step to situational analysis. In this study, the interpretive steps (5–6) are replaced by situational analysis.

Documents are simultaneously information containers as well as artifacts. Both

aspects provide important cues for reconstructing social processes and require proper attention when collecting and analyzing documents. Concerning the informational dimension of documents, economy and feasibility dictated a gradual approach. I read through all the documents and highlighted relevant passages. However, I only summarized and selectively paraphrased those I deemed especially important in the context of the analysis (which was still a lot).

In this study, it is important to recognize that documents have some kind of agency, or 'performativity' (Freeman and Maybin, 2011: 156) in order to to treat this data source adequately. While they do not act on their own – they are still indifferent kinds and rely on human actors' agency for coming into being and into circulation – they shape social action around them by how people collaborate in their crafting and how they react to a document's existence and content. Documents shape social action indirectly by coordinating collaborative processes around them. This means that documents, not only in their finalized state but also in their process of creation, may constitute boundary objects (Leigh Star and Griesemer, 1989). Documents can also teach us much about how its authors think. This is especially salient in an organizational context where writing is indispensable to collective thinking and problem solving. Crafting a report is part of a creative process in which ideas are formed rather than just represented. Looking at the history of a document might therefore reveal much about authors' thought process and strategy. Thus, I also captured this performativity in a memo for documents central to the social processes of interest.

Situational analysis

Clarke (2005) conceives situational analysis as an enlargement of grounded theory[7] which updates and complements its underlying social ontology and offers a new set of analytical tools rendered necessary by these modifications.[8] As a former student of grounded theory co-founder Anselm Strauss, Clarke pursues this project along the lines of Strauss' sociological work in the symbolic interactionist tradition. What she takes from him and other interactionists are the ontological 'root images'

[7] For an overview of grounded theory and its intellectual history, see Charmaz (2006).

[8] In her book, Clarke (2005) leaves out any treatment of traditional grounded theory data analysis techniques, which she deems useful for data pre-processing. My use of situational analysis dispenses with these grounded theory methods and uses other analytical techniques instead (cf. chapter 4).

Table 4.3: Concept translation

Actor-centered institutionalism	Symbolic interactionism
Composite actor	Social world
Action orientation	Commitment/perspective
Arena	Arena/action situation

of *social world*, *commitment*, and *arena* (Clarke, 2005: 45ff.). Social worlds are shared cognitive perspectives that form 'social wholes' akin to the public policy concepts of advocacy, respectively discourse coalitions (Sabatier and Weible, 2007; Hajer, 1995) (Table 4.3 illustrates how these concepts map onto each other). The notion of commitment much resembles the action orientations discussed earlier, for it is framed as identity constructions and action predispositions. Further, social worlds only know temporary stability. They are bounded by distinctive discourses, which are not necessarily coherent. Here, Clarke draws at once on the interactionist understanding of social worlds as 'universes of discourse', as well as Foucault's notion of discourse as disciplining and constitutive of identities and social collectivities (Clarke, 2005: 54ff.). This highlights the coproductionist relationship between discourse and social worlds: social worlds articulate and reproduce discourses, which in turn establish boundaries between social worlds and provide meaning to a world's participants.

Clarke's most original move is to construe of an action situation as the unit of analysis. She dismisses the notion of context and argues that in the empirical action situation there are only elements that are felt as consequential for the participating actors. Conditions are not outside a situation, they are constitutive of it and are therefore an intrinsic part. This is an *empirical* contention and Clarke does not reject theoretical assumptions about structuring effects from more stable social entities. However, they require empirical substantiation.

> "I am arguing in favor of focusing empirically on the situation as a whole and on examining distinctions made there from the perspectives of different actors, rather than a priori, categorically, and solely from the perspective of the researcher." (Clarke, 2005: 66)

This is where the methodological part of situational analysis takes over with situational maps (cf. Clarke, 2005: Chap. 3). They offer three *foci* on an action situation by asking

1. what human and non-human elements are constitutive of an action situation and how do they relate with each other?
2. what social worlds (i.e. collective actors) are there, what are their perspectives? what kind of resources do they dispose of? how do they engage with each other in negotiations?
3. what are the salient issues in an action situation? what are the positions taken and not taken regarding them?

Clark translates these *foci* into visual mapping strategies, which, in conjunction with sensitizing concepts, form canvasses for interpretation and memo writing. While some maps may serve as the basis for a later visual illustration, they are not analytical end products (Clarke, 2005: 137). Rather, they are works in progress. As new insights emerge, elements are added or removed. A map is done when 'saturation' has been achieved (Clarke, 2005: 108).

While I adhere to Clarke's conceptual toolbox and the three *foci* to interrogate the data, my use of mapping techniques was not systematic. Policy formulation is a highly organized enterprise (also in terms of the participating actors), which somewhat reduces the exploratory value of mapping. Nonetheless, drawing maps was useful at times, but mostly I inquired action situations through memo writing.

Clarke (2005: 77) uses 'sensitizing concepts' – originally proposed by Blumer (1954, 1969) – as 'directions along which to look', as opposed to closed concepts that prescribe 'what to see'. In addition to structuring the analysis into two steps – establishment of the institutional context followed by case studies –, the use of sensitizing concepts is a firm part of how this research strives for empirical grounding of its theoretical propositions.

Since sensitizing concepts require empirical substantiation, their identification and operationalization is not spelled out to the same extent as a more deductive and theory testing approach would command. Table 4.4 lists the most salient concepts for this research (first column) and offers some empirical traits for each concept (second column). Where applicable, the table refers to other sections of the text that discuss certain concepts. Further clarifications and a description of the analysis protocol may be found in the appendix (section B.3).

Table 4.4: Sensitizing concepts

Concept	Empirical Traits
Scientific expertise (ontological)	Section "A working definition of scientific expertise" (p. 10) separates it from other policy-relevant kinds of knowledge. See also section "The epistemic dimension of scientific expertise" (p. 20).
Scientific expertise (empirical)	*The issue* (what is it about?); *The producer* (who is the producer and why?); *The medium* and sites of interaction (e.g. a written report; face-to-face hearing; news media diffusion through press release or conference, or live expert appearances). *The principal* (is advice directly or indirectly mandated by government, another sponsor, or the autonomous initiative of an advice producer?) *The audience* (is it well defined or diffuse)?
Institutions (ontological)	See section "A neo-institutionalist tool kit" (p. 54).
Resource distribution	*The principal* (which public and private actor dispose of financial, organizational, and symbolic capital to sponsor scientific expertise?) *Independence* (budgetary envelope vs. project-based financing of expertise.)
Action situation/Arena	Is action self-referential, oriented at subsystem participants, or directed at the larger public? Section "Action situations" (p. 62) provides a more exhaustive list.
Social world/actor Commitment/ action orientation	See the elements listed in section "Situational analysis" (p. 104).
Effects of expertise mobilization	See discussion in section "Effects of scientific expertise" (p. 78).

This list of sensitizing concepts concludes the theoretical and methodological part of this study. The following chapters will provide an empirical investigation into scientific expertise and the Swiss decision-making process.

Five

The Swiss Advisory System

5.1 Introduction

Scientific expertise is an important enough component of modern democracies that it can be regarded as an institutionalized phenomenon. Jasanoff (1990) went so far as to call it 'the fifth branch' of government so to underscore the power that expertise wields in regulatory governance. But the label 'institutionalized' should not trick us into thinking that the phenomenon manifests itself in the form of a neat, science court-like institution that presides over contentious questions of a factual nature. Instead there are a heterogeneous assemblage of organizations proffering expertise, a certain demand structure, and rules and expectations governing the interplay between these. This chapter will describe and characterize the individual parts which form the Swiss advisory system, given that a comprehensive and up to date survey does not currently exist.[1] But identifying and describing the individual elements of that system is a means rather than an end in itself. The key question it is designed to answer is how the system relates to the Swiss decision-making process.

The lesson from the literature review (cf. section 2.5) has been that there is no unified way to identify and analyse an advisory system and its links to decision-making. However, in the conceptualization of expertise mobilization outlined earlier (cf. chapter 3) I suggested that several elements might be relevant: the distribution of access to expertise, regulative norms of both a formal and informal nature, and power concentration within the political system. Treating these elements as sensitizing concepts, I will proceed as follows. In the first section I look at the main

[1] At times, no such overview exists in English. For a comprehensive overview in German of policy advice, see Sager and Stadelmann-Steffen (2008). On Swiss science, technology and educational policy, Braun and Leresche (2007) offer a comprehensive overview in English.

pillars of the Swiss political system, and the distribution of power and resources to mobilize expertise therein. In the second section, I advance the argument that science as an institution does not constitute a pillar of political legitimacy in Swiss political culture, which, however, does not prevent political argumentation in reference to science. In the third section I propose a classification of the different sources of policy-relevant research which distinguishes between three organizational models (networks, contracts, and delegation). Drawing it all together, the concluding section offers a picture of the Swiss advisory system through contrasting stable and changing elements.

5.2 Resource and power distribution in the political system

The Swiss political system is best known for its institutional idiosyncrasies, involving a collegial executive, instruments of direct democracy controlled by the people, and federalism. This section describes them in order to determine the power distribution that they afford, and the ways in which the necessary resources for mobilizing scientific expertise are distributed.

Federalism

Switzerland is a federal country composed of three tiers of government: communities, cantons (of which there are 26) and the federal state. Swiss federalism is the historic coming together of individual member states called *cantons*. Between the 13th and 19th centuries, individual cantons joined the Swiss confederation. After a very brief civil war – which opposed a liberal, urban majority against a conservative and rural minority, and which ended with the victory of the former – the constitutional settlement of 1848 became the foundation of modern Switzerland. While being much more integrated than previous confederate forms of cooperation between cantons, the modern state nevertheless retained federalism as a constitutional principle, which was important to the protection of the Catholic minority, who were concentrated in small rural cantons. The liberal majority also made further concessions to this territorially anchored minority. Parliament's design is absolutely symmetrical and bicameral, such that every canton, small or large, receives

two seats in the upper house (Council of States). The implication for the decision-making process is that both houses need to reach an agreement. Moreover, any constitutional amendment was to be ratified by a mandatory popular referendum, which to this date requires a so-called 'double majority'. Thus, not only is a majority of the popular vote necessary for constitutional change, it has also to be accepted by the popular vote in a majority of cantons. The small cantons are therefore in possession of very strong veto powers, which have increased over time as population disparities between large and small cantons have increased with urbanization.[2]

Braun (2003) argues that Switzerland uses a 'decentralized' form of federalism, in which tendencies toward centralization might not entirely be absent, but where such shifts require justification. The cantons have a very strong position in the Swiss system, as all competences not constitutionally delegated to the central government fall under their jurisdiction (Linder and Vatter, 2001: 95). The acquisition of new competencies by the federal government therefore requires a constitutional amendment, which necessarily involves a popular vote.

Cantons are integrated into the federal policy process through a host of formal and informal channels, which – contrary to the intent of the 1848 constitution – evolved into a multilevel system of vertical cooperation (Linder and Vatter, 2001; Vatter, 2005). Many federal programs are implemented by the cantons, giving them large discretionary powers, though they have little hard power in the federal decision-making process. Unlike the German *Bundesrat*, the Council of States does not formally represent the cantonal governments. However, a minimum of eight cantons may call for an optional referendum on a law voted through in Parliament. Cantonal representatives also participate in many policy formulation processes through membership in advisory commissions; similarly, cantons are routinely consulted about federal legislative proposals.

Direct democracy

The advent of direct democracy followed a progressive evolution in Switzerland. The mandatory referendum required for all constitutional amendments was intro-

[2]See Papadopoulos (2002) on how social transformations have distorted the conception of minority representation anchored in the 1848 constitution and left essentially unchanged until today.

duced as part of the 1848 constitution. The optional referendum and the popular initiative [proposition] followed suit as part of constitutional reform in 1874 and 1891, respectively.[3]

According to Papadopoulos (2001), it is not so much the fact that direct democratic instruments also exist at the federal level of government (unlike in the United States, for instance) or the frequency of its use that sets Switzerland apart, but that these instruments are entirely under the control of the population. Thus the elite cannot make strategic use of direct democracy (for instance by decreeing that a referendum will be held). The opposite is in fact the case: it is the governing elite who have to adjust their strategies to pressure from *below*.

Papadopoulos (2001: 38) notes three ways in which the political system adjusted to the substantial uncertainty introduced by direct democracy, in order to prevent or steer its use. Firstly, the governing coalition was expanded to include the major political parties that had successfully demonstrated their strategic use of direct democratic instruments against the governing elite (cf. section 5.2). Secondly, stakeholder groups with the potential to launch a referendum are actively integrated into the rather long policy-formulation process, through membership in advisory commissions and formal and informal consultations.[4] Finally, in the case of a successful launch of a popular initiative, the latter may be diffused or moderated by means of a direct or indirect governmental counterproposal. In reaction to counter proposals, sponsors of popular initiatives sometimes retract their proposition if they feel that their demands have been met. A counter proposal may also weaken the chance of an initiative at the ballot.

[3]Government-initiated constitutional amendments, and proposals of Swiss adherence to international organizations, are subject to a mandatory referendum, requiring a double majority of total popular votes and cantons in order to pass. An optional referendum can be requested by 50'000 signatures or 8 cantons, to be submitted in less than 100 days after the formal publication of a law adopted by Parliament. A simple majority is sufficient. The popular initiative requires 100'000 signatures. Initiatives can only lead to constitutional amendments and are thus also subject to the double majority rule. A general initiative enabling the initiation of federal laws was introduced and then aborted before being used, because it was deemed to complicated in practice.

[4] Neidhart (1970) famously hypothesized that expert commissions and stakeholder consultation procedures are an important complement to direct democracy, since they are presumed to be instrumental in integrating actors capable of launching a referendum.

The system of government

The Swiss political system[5] is of neither the parliamentary nor the presidential kind. Its executive is composed of seven members and is called the *Federal Council*.[6] As a directorate, the Federal Council is a collective body, and each of its members represents the government as a whole in public. Federal Councillors thus do not defend their own opinion but that of the collective, even if this should be against their personal preference. Federal Councillors simultaneously head the federal administration. Each of them presides over a single ministry – called a department in Switzerland – which is divided into offices, such as the 'Federal Office of Public Health' or the 'Federal Office for the Environment'. The federal offices form the core of the administration and are led by a director. The administration has been composed of the same seven departments since 1848, and public administration reform is extremely difficult, often suffering important setbacks at the ballot (Varone, 2006).

Federal Councillors are elected by Parliament for a four year term. Unlike in a parliamentary system, however, there is a strict separation of power, and neither government nor Parliament has the power to dissolve the other. As a result of the political elite's coping strategy with direct democracy (cf. *supra*) and the stable power distribution between the major political parties, the Federal Council is *de facto* a multi-party government. Between 1959 and 2003, the same four political parties each occupied the same number of seats in the Federal Council.[7] Despite this exceptional stability, it has to be noted that this system of *concordance* government [Konkordanz] is not to be confused with a coalition government. Firstly, there is no coalition agreement specifying binding goals for the legislature. Secondly, party discipline is weak because the party system is vertically fragmented (with there sometimes being considerable disagreement between cantonal sections and the national party) and because of the missing governmental power to dissolve Parliament. Thus Linder (2007: 26) remarks that power-sharing in Switzerland is not

[5] For a comprehensive overview, see Kriesi and Trechsel (2008).

[6] One Federal Councillor is elected president of the confederation for a one year term by Parliament. There are no special prerogatives associated to the presidency other than ceremonial duties and chairing the meetings of the Federal Council. This form of government is unique and is not directly comparable to either a presidential or parliamentary system.

[7] Swiss People's Party (SVP): 1 seat. Radical Party (FDP): 2 seats, down from full dominance of the government in 1848. Christian Democratic Party (CVP): 2 seats. Social Democratic Party (SPS): 2 seats.

induced by the political elite, but that it is an extant institutional configuration that forces the latter into cooperation.

Parliament is of symmetrical bicameral design. Each legislative proposal has to pass both the *National Council* (lower house, 200 seats) and the *Council of States* (upper house, 46 seats). The cantons form the electoral districts. Proportional representation for elections of the National Council was introduced in 1919, following civil unrest, and led to the formation of a multi-party system of exceptional stability. It was not until the 1990s that important power shifts appeared, with the right wing Swiss People's Party (SVP) rapidly gaining in electoral strength, mainly at the expense of the Radical Party (FDP) and the Christian Democratic Party (CVP) (Ladner, 2007: 328).

A dual system of representation

When considering the representation of particular interests in the Swiss context, one has to consider the political parties as well as interest groups. Political parties in Switzerland are structurally weak. There is no public financing for political parties in Switzerland, and, consequently, they have few financial resources and depend on donations. This has direct repercussions on the degree of professionalization and the analytical capacity that parties can acquire – such that many parties, for instance, rely heavily on volunteer labor even at the most senior levels. The party system is also incredibly fragmented. Political parties have strong cantonal roots, but the national organization of a political party is more of an umbrella organization, and it is not uncommon for cantonal sections to deviate considerably from the national party. Political parties are also horizontally fragmented: there are over a dozen parties active at the national level (Ladner, 2007: 310ff.).

Interest groups – such as trade unions and employers' associations – are also highly decentralized. However, their umbrella organizations at the national level tend to be much better organized, and have many more financial resources, than the political parties. This translates into better analytical capacities. For instance, Switzerland's only major think tank, *Avenir Suisse,* is financed by the business community (Kriesi and Trechsel, 2008: 104). Interest groups have traditionally wielded great influence in the pre-parliamentary phase of the decision-making process, be-

cause they have been integrated into extra-parliamentary commissions and invited to comment on policy proposals.

Flexible affordances of rigid institutions

The institutional foundation of the Swiss political system is rigid and accommodates for diversity through federalism (and associated bicameralism), proportional representation, a multiparty collegial executive, and instruments of direct democracy controlled by the people. This has fostered the textbook image of Switzerland as an exemplar of consensus democracy (Lijphart, 1999), with a well-articulated coordinative discourse in the form of extensive stakeholder inclusion during policy formulation (the so-called pre-parliamentary phase, in Swiss political science jargon). However, recent scholarship (Häusermann et al., 2004; Mach et al., 2003; Papadopoulos, 2008; Sciarini, 2013) shows that the dominance of this coordinative discourse is weakening, despite institutional rigidity. An indicator for this is that the median ratio between the length of the pre-parliamentary and parliamentary phase of decision-making has reduced from about 4:1 to 3:1, when the early 1970s and late 1990s are compared (Sciarini, 2007: 475). Moreover, the density of elite networks has declined since the 1980s, which has affected cooperative venues of policy coordination (e.g extra-parliamentary expert committees; cf. section 5.4).

The reason for these changes is that the once all-powerful interest groups are losing influence. Internationalization (adoption of treaties or autonomous adaptation to international changes) has reduced the role of domestic actors in policy-making, because it requires swift political action, which is fundamentally incompatible with the heavy, time-intensive procedures of maximum inclusion (Papadopoulos 1997: 78; Sciarini 2007: 474). This has empowered the executive relative to interest groups, for a non-inclusive and technocratic style of decision-making tends to marginalize the latter (Papadopoulos, 2008).[8] Further, increased polarization of partisan competition (amplified by media scrutiny), and new conflict structures leading to less stable coalitions, has empowered the political parties represented in government at the

[8]The weakening of interest groups in not only a question of procedural efficiency. International economic pressures are dividing interest groups into business associations oriented toward the international market, and others with a domestic orientation, such as the farmers' and small business organizations (Kriesi and Trechsel, 2008: 100).

expense of interest groups (Papadopoulos, 2008; Sciarini, 2013). The reinforcement of the main political parties manifests itself in the increasing importance of Parliament as a venue for policy formulation. Parliament introduced permanent specialized committees in 1992, and has since then strengthened their competencies. As a result, the number of legislative processes controlled by Parliament from start to finish have increased (Lüthi, 2009). The relative shortening of the pre-parliamentary phase signifies the empowerment of the executive in internationalized policy domains, and of Parliament in domestic ones. But in any case – and this is of particular importance to the present study – Switzerland can no longer be regarded as a paradigmatic case for a dominant coordinative discourse, given that venues of corporatist interest intermediation have lost their importance. This does not mean that Switzerland has become an example of strong power concentration with a predominantly communicative discourse. But further analytical attention to communicative discourse is certainly warranted.

5.3 Science and political institutions

Earlier in this chapter I described how internationalization and increased polarization of partisan competition have reinforced the power of Parliament and of the major political parties at the expense of interest groups (cf. section 5.2). This reinforcement of Parliament as a venue of policy-making does not mean that the political system has changed completely; after all, the administration still controls substantially more decision-making processes than Parliament. But because Parliament as a venue is more accessible to media scrutiny than the executive, policy-making has moved further into the public arena when compared to the 1970s and early 1980s. This is equivalent to the strengthening of the communicative discourse relative to the coordinative one, at least in domains like social policy. As established in the discussion of ideology as a potential substitute for science (cf. section 3.4), the register of justification an actor draws upon is dependent on a witnessing public's endorsement of it. This warrants two questions. Firstly, what relationship does the Swiss public have with science? Secondly, is Parliament a venue for the mobilization of scientific expertise?

To my knowledge, there is no direct research on how the Swiss public perceives the engagement of scientific experts in matters of policy. We therefore do not know whether politicians can effectively enhance their credibility by making a show of scientific expertise in public, or whether the publicly visible role of experts in policy-making has legitimatory power. Instead, we have to construct an account of this by indirect means. Research in the 'public understanding of science' (PUS) tradition and drawing on Eurobarometer survey data and media analysis shows that the Swiss public has a globally favorable attitude toward science. The evidence is quite clear that this positive valuation of science is not connected to the generally high scientific literacy present in Switzerland. For instance, while science related popular initiatives stimulate scientific literacy through their public campaigns, better knowledge about science does not lead to higher levels of trust in it (Bonfadelli et al., 2002). Instead, trust in science appears to be mediated by trust in institutions. The picture is somewhat differentiated: there is a negative linear relationship between trust in science and trust in the church. Inversely, the more strongly somebody trusts industry and the press, the stronger his/her belief in science as an engine of progress. Curiously, trust in political institutions such as the Federal Council is not related to trust in science (Crettaz von Rotten et al., 2003). There is also a linguistic divide, with each linguistic region mirroring the attitudes of the neighboring country that shares the same language (Crettaz von Roten and Leresche, 2004).

The heuristic value of these findings is probably greatest for understanding political dynamics regarding science policy. But, and at the risk of over-stretching interpretation, the absence of a relationship between trust in political institutions and trust in science could be read as a counter to Ezrahi's (1990) demonstration of the co-construction of trust in representative institutions of liberal democracy and trust in science. It is consequently not to be expected that politicians would draw on expertise and scientific reason in communicative discourse to legitimate political institutions. Given the Swiss People's Party success, a populist agenda that continuously affirms that 'the people know best' seems to be a far more effective means to this. We also have to consider direct democracy in that respect – less with regard to its indirect effect of forcing the integration and consultation of 'referendum capable' actors, than in terms of the communication between the elite and the people. Since

elections are not the only mechanism of accountability within the political system, but are supplemented by issue votes, MPs need to appeal to the popular will rather than to expert arguments, as they are ultimately re-elected by the population. Policy decisions that have provoked a referendum or popular initiative furthermore receive a great deal of media attention, which also works against dispassionate argument (Bussmann, 1997).

The tentative statement that science does not constitute a source of legitimacy for political institutions may be further corroborated by looking at Parliament and the organization of committee hearings therein. In fact, the opinion of a scientist invited for a hearing is *a priori* not weighted any differently from the statement of an interest group representative. As civil servants and MPs interviewed for the present research consistently reported, hearing participants are recruited according to a criteria of opinion pluralism. This is a quasi formal rule – except that it is not codified. Experts, while not stakeholders, are treated like them, and it is taken for granted that experts are not free from interests (which is not perceived as problematic, as long as it is clear what the interests and biases are).

However, as Frey's study of the use of policy evaluation evidence in policy revision processes shows (Frey, 2010a: 242–5), such reports are not simply ignored or openly supplanted by ideology in parliamentary debate. While congruence between evidence, ideology and interests were decisive in whether or not a MP was convinced by systematic policy evaluation evidence, evidence claims were countered by opponents not with ideological statements, but through relying on the same register of justification. Evidence claims were countered with attempts to discredit them, either by advancing alternative evidence claims, or, if these were not available, by calling for an 'independent' study. Frey describes the discrediting of reports by casting doubt on their credibility as an argumentative routine. Interestingly, she finds fewer arguments that give reference to evidence in cases of policy proposals with a firm grounding in evidence, compared to those where the evidence is less certain. Moreover, even in cases where there was a solid scientific consensus, value conflicts led to attacks on the credibility of evidence.

The cautionary lesson we can draw from this research is that scientific rationality does not constitute a pillar of institutional legitimacy, and that Parliament

largely constitutes a venue of opinion pluralism, without qualifiers of 'objective' or 'neutral'. Yet at the same time, arguments with reference to evidence are deployed, and challenged within the same register of justification. Refusing science a special place, but using it as a distinct rhetorical form in political argumentation, seems at first sight to be paradoxical. But when we consider that policy reform projects that are firmly grounded in solid evidence attract less rhetoric of this kind, it appears that evidentiary arguments replicate underlying value conflicts.

5.4 Sources of scientific expertise

Science-based policy advice oriented interactions between the academic and political sphere in Switzerland can be broken down into three broad domains. Firstly, there are multiple interpersonal linkages between academic and political elites. Secondly, the work of the federal administration generates a demand for policy-oriented research, which is satisfied through contract research. Thirdly, the federal government earmarks part of its research funding budget for National Research Programs (NRP) which investigate politically defined strategic research priorities. In what follows, these three intersections are explored in more detail.

Interpersonal networks

Several kinds of interpersonal connections link academia to the public administration and Parliament (cf. Koller, 1989). Most obviously, civil servants with an academic training bring a scientific background to their work. Some civil servants, in turn, teach at universities as adjunct professors. On the other side, some university professors serve on extra-parliamentary commissions (cf. below) or are elected MPs. The structure of these personal linkages is strongly influenced by civic engagement [*Milizprinzip*] and the concordance system of government. The former is a fundamental organizational principle of public life in Switzerland. Based on a strong republican tradition that demands public engagement of citizens in public life, many public and civil society institutions are staffed not by professionals but people who have other primary employment. Originating from the conception of the military as a militia, in which all able-bodied male citizens defend the country,

as opposed to a professional army, we find a number of offices subscribing to the same system (Kley, 2009). This holds true for executive mandates at the community level of government. It also applies to parliaments at all levels of government, even though the mandate of members of the Federal Parliament has long since exceeded the boundary of this system in practice (cf. Pilotti et al., 2010). However, recently the judiciary has been largely professionalized and citizen juries or lay appeal commissions have given way to professional structures. We shall turn now to a discussion of the 'extra-parliamentary' commission system, which is an important pillar of expertise production.

Extra-parliamentary commissions

A large number of commissions complement the professional core of the Swiss federal administration. These commissions are composed of federal administrators, representatives of the cantons and communes, expert advisors from universities and the private sector and interest group representatives. Officially, these commissions are called 'extra-parliamentary', and are described in the literature as the militia, or non-professional, administration because a majority of commission members are not employed by the federal government (Germann, 1981). They are firmly anchored in the executive branch of government because the legislative is largely excluded from membership and because they are appointed by the Federal Council and logistically supported by the administration.

Extra-parliamentary commissions are entrusted with a multitude of tasks, from studying particular problems like energy security, preparing legislative texts (e.g. regulation for enhancing the stability of the banking system), surveying a particular policy domain such as biomedicine, guiding implementation of public policy, and regulating markets (e.g. enforcement of antitrust regulation).[9] Commissions are of subsidiary nature to the administration. According to official guidelines – which appeared for the first time in the 1970s – the establishment of a commission should only be authorized when the administration lacks capacity or relevant know-how and where the intramural acquisition of such knowledge would be too expensive (Rebmann and Mach, 2013: 175).

[9] See Rebmann and Mach (2013: 171–173) for a precise description of the commissions' tasks.

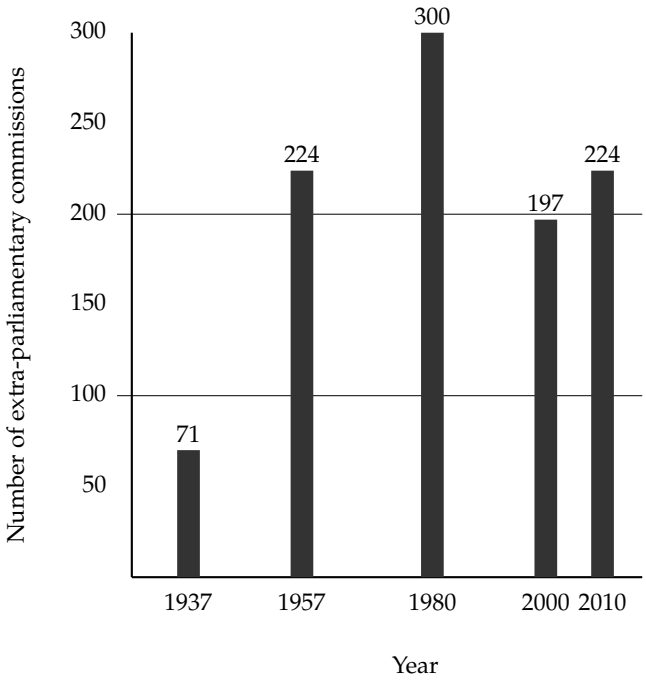

Figure 5.1: Commissions in time. *Source:* Rebmann and Mach (2013: 175).

Organization of commission work The commission system was for a long time rather opaque, with the actual number of commissions not known even by the government, and next to no formal governance before the 1970s. This situation has changed. Two research projects[10] have given clarity on the number and composition of the commissions over time. In addition, Parliament has led a sustained effort to establish a governance framework through legislative initiatives and a government oversight function. Successive decrees from 1970, 1974 and 1977 formalized the power to establish a commission (placing it in the hands of the Federal Council and the departments), limited membership duration to 16 years, and officially recognized the role of interest representation within them. In 1978, commission governance became part of the Government and Administration Organization Act (GAOA). Following repeated findings by the Parliamentary Control of the Administration (PCA) – the body supporting Parliament in overseeing government – that there are important transgressions of legal provisions in the practice of the commission system, a 1996 governmental decree further reduced commission membership

[10] Germann (1981) produced a survey of the commissions and their membership during the 1970s and more recently Rebmann and Mach (2013) have produced an in-depth examination of the commission system's evolution as part of a larger research project on the Swiss elite during the 20th century.

to 12 years. Finally, the Federal Council launched another initiative in 2005 to further reduce the number of committees by postulating a strict subsidiarity rule and thereby strengthening the governance of commissions and improving transparency. Following these changes, the Federal Council alone is able to establish a new commission (an explicit wish of Parliament), which requires an official justification, and commission members need to declare other mandates and conflicts of interest (Rebmann and Mach, 2013: 179–181).

Extra-parliamentary commissions are currently regulated on three different levels. Articles 57a–57g GAOA regulate the enactment and review of a commission (a–d). Commissions may be enacted for advisory or representative purposes while still respecting a subsidiarity principle that forbids commission formation when the corresponding task could be executed by the federal administration. Commission tenure is fixed at four years, at which point the need for it is re-assessed and, if deemed of further use, its members re-elected by the Federal Council. Furthermore, commission composition, mandatory declaration of conflicts of interests, and financial compensation is provided for by the law (e–g). The size of commissions is limited to 15 members and its composition has to respect a balance of gender, language, geographic region, age and interest groups. This legal provision is complemented by the Government and Administration Organization Decree (GAOD), whose articles 8a–8i offer further clarification. Those who would also qualify for employment in the federal administration are eligible for commission membership. Moreover, commission-balancing criteria demand that at least 30 percent of either gender and a minimum of one member per linguistic group be represented. Age limits have been lifted, but tenure is limited to 12 or (under exceptional circumstances) 16 years. Each member is required to declare mandates and functions for public and private organizations. Failure to submit or update this declaration may result in expulsion. Details of commission organization are regulated in the inaugural decree specified by the Federal Council for each new commission (Art. 8e GAOD). Specifically, this concerns the definition and justification of the remit of a commission, the actual number of its members, its internal organization, rules for public communication, financial compensation for members, and which administrative unit is financially and logistically responsible (e.g. secretariat) for the commission.

There is very little data on how commissions work in practice, and it can only be guessed how the increasing formalization of commission appointment influences that work. Somewhat more can be said about the role of scientists in commissions. Based on extensive interviewing of commission members, Germann (1985, 1991) concludes that, contrary to what a decisionist or technocratic mode of interaction might suggest, the relationship between science and politics in the commission lacks any clear hierarchy. Commission members do not see themselves either as scientists or as politicians, but instead give very heterogeneous self-assessments. Scientists in the commissions also disagree about how often scientific knowledge is decisive in the debate. Natural scientists tend to have a more positive assessment of the importance of such knowledge than social scientists. This leads Germann to conclude that the Habermasian pragmatic model of policy advice (cf. Habermas, 1976) best describes the commission system.

The reduced significance of commissions The 1960s and 1970s were a time of large scale planning (e.g. constitutional reform (Germann, 1975), general traffic masterplan (Germann, 1981: 17), energy planning (Mironesco et al., 1986)), and such exercises relied heavily on commissions. Many commissions on socio-economic issues were created during the economically turbulent 1970s (Rebmann and Mach, 2013: 176). Since the 1980s, however, the political importance of commissions has been in decline – both in terms of numbers (cf. Figure 5.1) and political importance. According to Papadopoulos (1997: 75–78) just over a third of decision-making processes during the early 1970s involved a commission. These numbers are lower for the period 1995 to 1997, when only about 10 percent (17 out of 162) of the federal acts voted on by Parliament were elaborated in expert commissions (Biedermann, 2002: 23).

As one of the venues of corporatist interest intermediation, extra-parliamentary commissions are directly affected by the decline of such procedures of conflict resolution (cf. section 5.2). Commissions have only a limited integrative capacity, as only a minority of commission members belong to powerful civil society organizations (the majority being scientists and administrative officials) (Germann, 1981; Rebmann, 2011; Rebmann and Mach, 2013). Moreover, the commissions operate

according to a majoritarian, rather than consensus, logic (Sciarini, 2007), and sometimes members publicly resign in protest (cf. Mironesco, 1993)

Mandated research

The work of the federal administration engenders a steady demand for policy oriented research for policy formulation, implementation, and evaluation. Demand for policy-oriented research that is executed or financed by the federal administration – that is, *agency research* [*Ressortforschung*[11]] – emanates from the different units of the federal administration and from obligations fixed in different sectoral laws and international treaties, as well as from parliamentary requests submitted in form of motions. Most of this research is conducted extramurally. Of the CHF 247 million spent in 2010 on agency research, only 35.5 percent was spent on intramural research, which almost exclusively consisted of agricultural research (31.7 percent of the total expenditure).[12] These are only the direct research investments of the federal administration and do not include indirect expenses through the funding of the two federal institutes of technology (ETHZ and EPFL) as well as the four associated research institutions (PSI, EMPA, EAWAG, WSL). The intramural research capacity of the federal administration is therefore rather limited.

Agency research is governed through constitutional provisions 64 and 170 and detailed in the Federal Act on Research, which identifies the federal administration as a 'research institution'. For a long time, agency research has been under the firm control of the different federal offices, who control the respective budgets. While an administrative centralization of the different research activities was never achieved, a steering committee under the lead of the State Secretariat for Education, Research and Innovation (SERI)[13] has been in charge of coordination (since 1998) and quality assurance (since 2002) (cf. Farago and Brunner, 2006). Represented in this committee are the Swiss National Science Foundation, the Commission for Technology and Innovation, the Federal Institutes of Technology and associated research organizations, and the directors of the agencies conducting research. The

[11] For an assessment of agency research during the 1980s, see Germann (1991: 192ff.).

[12] cf. `http://www.ressortforschung.admin.ch/html/dokumentation/zahlen_de.html` (Accessed Jan. 20, 2013).

[13] Known as the State Secretariat for Education and Research (SER) prior to 2013.

database ARAMIS,[14] which logs the federal R&D projects since 1999, constitutes an additional policy instrument for assuring accountability and transparency of the system.

Another category of demand for policy-oriented research are expert reports mandated by the federal administration, a topic which the present study treats in-depth during the subsequent chapters. A report by the Parliamentary Control of the Administration (PCA) (Bättig et al., 2006) estimated that the federal administration spent about CHF 144 million on policy-oriented advisory mandates in 2004.[15]

The main instrument for governing expert mandates is through financial control. As a service which the state procures on the market, it is subject to the World Trade Organization's procurement guidelines, which federal law specifies in the Public Procurement Act and the corresponding executive decree. According to this legal framework, mandates below a net value of CHF 50'000.- may be awarded directly to a selected client. A price quote from at least three parties is required for service contracts amounting up to CHF 230'000.-, beyond which a public tender must be held. As it has been criticized in the above-mentioned PCA report (ibid: 2006), the procurement of many expert reports has taken place without following this legal framework, or mandates have been split up in order not to exceed the CHF 50'000 threshold. Parliament has demanded more transparency by calling for the systematic publication of all expert reports, including full financial disclosure (Motion Swiss People's Party, CuriaVista 04.3755). In fulfillment of these demands, as well as of some of the recommendations by the parliamentary commission on government oversight, the Federal Council decided to establish a publicly accessible database on public procurement, which is to include expert mandates.[16] Independently of this, but nonetheless of importance, was the enactment of the Federal Act on Transparency in the Public Administration in 2006, which regulates public access to information of the federal administration. Other than these provisions, there are no other formal legal foundations governing expert advice. The Federal Coun-

[14] http://www.aramis.admin.ch

[15] In the political debate following the publication of this report, the expenditure for policy advice was often confused with the estimated total expenditure for mandated services (including IT contracts etc.) of CHF 600 to 700 million (Bättig, 2008).

[16] This database is now online and covers expert reports from 2010 onwards. It is accessible at http://www.admin.ch/dokumentation/studien/suche/index.html?lang=en (Accessed Jan. 21, 2013).

cil, for instance, is not required to publicly comment on expert reports: it is only forced to articulate an opinion for reports published by the parliamentary government oversight commission, which are sometimes based on externally mandated reports (Federal Act on Parliament, Art. 112).

Evaluation of the effectiveness of policy measures is another important source for demand of policy-oriented research. With the general overhaul of the Federal Constitution in 1999, a provision mandating Parliament to review the effectiveness of federal law (Const. Art. 170) was introduced. Subsequently there has been a growing demand for *ex post* (Balthasar, 2009; Bussmann, 1997; Frey, 2010b,a; Widmer and Neuschwander, 2004) – and more recently also *ex ante* (Sager and Rissi, 2011) – policy appraisal.

As opposed to the federal administration, Parliament is only a minor actor in supporting or commissioning external research, despite its standard setting role for advisory governance. This is largely explained by the weakness of Parliament's own administration, the parliamentary services, whose development has been hampered by public resistance against the professionalization of Parliament (cf. Kriesi, 2001). Within the parliamentary services, only the PCA commissions external evaluations, for which it disposes a tiny budget of between CHF 200 and 300 thousand (Bättig, 2007). In addition to its oversight function, Parliament draws on external expertise in committee hearings, which take place behind closed doors. However, it is extremely rare that external experts are consulted for more than a single hearing, as several MPs interviewed for the present research confirmed. The federal administration, rather than external experts, is the main source of scientific advice for Parliament. Finally, while the instrument of ad hoc parliamentary inquiry commissions exists to investigate exceptional events, this is not the case for policy-oriented study commissions comparable to the German *enquete-commission* (cf. Weingart and Lentsch, 2008).[17]

[17] A parliamentary initiative by the green group aiming at the introduction of such an instrument was rejected in the National Council in 2003 (CuriaVista 02.427).

Research providers

The market for policy-oriented research in Switzerland is considerable. As we have seen, the federal government alone spends roughly CHF 300 million *p.a.* on *extramural* research and consulting (this corresponds to 0.48 percent of the total 2011 federal expenditures).[18] One can only guess at how much this figure increases once potential demand for external expertise by the 26 cantons and 2459 communes has been added. Data from Bättig et al. (2006: 36ff.) and the agency research statistics[19] identify private firms, publicly funded institutions of higher education and research, other non-profit organizations, and the federal administration itself as the most important contractors for policy-oriented research. Private firms, which often have close ties to academia (cf. Steffen and Linder, 2006), have a strong presence in the market for individual research reports (about 56 percent of all mandates in 2004). They are somewhat less important for agency research, where they obtained 14.2 percent of funding allocated in 2010. These firms may even apply for research funding under the 'national research program' initiative (cf. section 5.4). Their expertise is highly specialized and they sometimes have an effective sectoral monopoly due to this specialization and the small size of the country.[20]

Policy-oriented research not paid for by the federal government is sparse in Switzerland. In the field of political economy, trade unions and employers' associations have traditionally provided policy advice that was well-regarded despite its advocacy character. But other privately funded organizations are rare. The neoliberal and industry financed think tank *Avenir suisse* emerged only as late as 1999. It was followed some years later by a much smaller and less well funded think tank on the political left called *Denknetz* (Steffen and Linder, 2006).

[18]The calculation is based the estimated CHF 144 million of federal expenditure for external experts in 2004 (Bättig et al., 2006) and the expenditures for extramural agency research in 2010, published on `http://www.ressortforschung.admin.ch/html/dokumentation/zahlen_de.html` (Accessed Jan. 21, 2013).

[19]`http://www.ressortforschung.admin.ch/html/dokumentation/zahlen_de.html` (Accessed Jan. 21, 2013).

[20]Interviewed civil servants contended that they do not have a particular preference for working either with university-based experts or with private consulting firms. According to them, the former are cheaper (their R&D costs do not have to be covered by consultancy mandates), while the latter have a better availability and are more dependable in delivering on time. These interviewees note, however, that changes in the science system increased time constraints and diminished incentives for professors to engage in policy-oriented research and consulting. This suggests that changes on the supply side and not on the demand end are responsible for the growth of the private consultancy market.

Research funding

The third major interface between academic research and the state with relevance for policy advice is clustered around the federal government's research funding program. Academic research is tied closely to higher education in Switzerland, linking the policy domains of research, innovation and education (Braun and Leresche, 2007). The governance of this policy field is fairly complex, since education has long been a prerogative of the cantons, which also fund ten universities. Moreover, para-governmental organizations such as the Swiss National Science Foundation (SNSF), established as a private law foundation in 1952, and the Swiss Academies of Arts and Science (SAAS) are important partners in research policy implementation. A number of commissions with advisory and executive functions complement this governance arrangement, most importantly the extra-parliamentary commission Swiss Science and Technology Council (SSTC).

Based on the Federal Act on Research of 1983 and a budgetary proposal to be confirmed by Parliament on a quadrennial basis, public funding is allocated to a number of institutions defined as either research funders (e.g. SNSF and SAAS) or as non-commercial research institutions. The latter consist in the two federal institutes of technology and their four associated research centers (all funded by the federal government), the cantonal universities, and the universities of applied sciences and arts (mainly funded by the cantons). We will now focus on the research funders, especially the advisory functions performed by a host of organizations alongside SAAS, and the directed research funding programs of SNSF.

The Academies of Arts and Sciences

The Swiss Academy of Arts and Sciences (SAAS) is an umbrella organization which groups together the Swiss Academy of [natural] Sciences (SANS), the Swiss Academy of Humanities and Social Sciences (SAHSS), the Swiss Academy of Medical Sciences (SAMS), and the Swiss Academy of Engineering Sciences (SAES). Created relatively recently, in 2006, SAAS replaced the earlier inter-academy conference which had assumed a coordinative role since 1981. Tighter cooperation between the four academies is the result of the requirement by international academies that their na-

tional members represent the entire academic spectrum (Zürcher, 2009). However, the idea to completely merge into a single organization encountered too much resistance to be feasible (Interview V).

The academies have their origin in civil society and are rather heterogenous organizations. SANS dates back as far as the mid–19th century, SAHSS and SAMS were founded after World War II, and SAES only in 1981. The individual academies regroup the professional societies in their respective domain. Historically, the relationship between the academies – which are foundations under private law – and the state has been close. SANS, for instance, has collaborated with the federal administration since the early days of the modern Swiss state (established in 1848). Pioneering work by SANS working groups on cartography and meteorology, soon to be subsidized by the public purse, became the foundation on which respective entities of the public administration were established (Kissling-Näf, 2009). Similarly, an inter-academy expert group on biological safety that was founded as a self-regulatory initiative for adapting the guidelines of the US National Institute of Health (NiH) to the Swiss research context was later integrated into the state, and became the Swiss Expert Committee for Biosafety (Interview I). A reverse transaction took place in 2008 when the center for technology assessment *TA-Swiss* was transferred from the SSTC and was placed under the umbrella of SAAS. Nowadays, the academies are mandated by the federal government to execute a number of tasks, for which they receive a lump-sum budget on a quadrennial basis. This budget amounted to CHF 112 million for the contract period 2008–2011. These tasks are broadly defined in the Federal Act on Research (Art. 9) and comprise the fields of early detection of socially relevant topics in the area of education, research and technology, research ethics and scientific social responsibility, and the science-society relationship.

A number of inter and intra-academy expert groups and platforms are dedicated to these tasks, which are often performed through the voluntary and unpaid engagement of scientists. The fact that this work is sometimes carried out by already retired scientists, especially within SAES, prompted an interviewee to dub the academies an 'old boys' club' (Interview V). Examples of such working groups are numerous. SANS, for instance, has an entire 'platform science & policy' that

hosts topics as diverse as climate change,[21] genetic research, biodiversity, and north-south research cooperation. SAES is also prominently engaged in policy-relevant topics, such as the transition of the energy system. While SAMS is more strongly oriented toward the medical community, its Central Ethics Commission is a powerful standard setter in self-regulation of the fast moving bio-medical community. Its recommendations have para-legal status and carry great weight in law-making on medically assisted reproduction and stem cell research (cf. next chapter). In the science and innovation domain, the academies never managed to become an effective umbrella association that would represent the interests of the scientific community in politics. This is not only due to the academies' internal fragmentation, but also because of the SSTC (set up in 1965 to advise the Federal Council), which partially assumes this function. The academies were also sidelined as research funders: while they had been the driving force behind the initiative to establish the SNSF in 1952 (Benninghoff, 2004), the latter soon became the dominant body in this field.

How the academies' policy-oriented work feeds back into the public sphere and political system is not entirely clear, not even for the academies themselves. For this reason, SAES mandated a research study on the impact of science on climate policy (Lehmann and Rieder, 2002) in order to learn more about its influence. Interpersonal networks crosscutting the academies and politics are certainly important; similarly, regular use is made of the possibility to comment on policy proposals during formal consultations.

In conclusion, despite their civil society origins, the academies have maintained a close relationship to the modern Swiss state. While still remaining very heterogeneous bodies, closer integration came as a result of international pressure. Working groups of the academies now engage in a number of strategic foresight activities for the state, and attend to the human and social dimension of science in society. Much of this work relies on voluntary engagement and the decentralized organizational structures supporting these tasks are very different to the tightly integrated and professionalized organization of the *National Academy of Science* in the United States or the British *Royal Society* (cf. Blair, 2011; Collins, 2011).

[21] The climate change related committees ProClim and the consultative body on climate change, to be discussed in a later chapter, is part of SANS' science and policy platform (Niederberger, 2005).

Directed research funding

We have already looked at policy-oriented research conducted under the helm of the federal administration, which is, for the most part, contracted out either in the form of agency research or as individual research mandates. Moreover, we have also discussed the performance agreement under which the academies receive funding from the federal research budget in order to engage in foresight activities, such as technology assessment. But the lion's share of federal research support expenditures not earmarked for higher education institutions is allocated to the SNSF. As the country's most important all-purpose research funding agency, SNSF allocates some 20 percent of its expenditures to two programs that pursue politically defined objectives (Braun and Leresche, 2007: 743). Instituted in 2000, the program National Competence Centers in Research (NCCR) seeks to concentrate research investments in order to create internationally competitive networks of excellence around a select number of issues. However, I shall devote most attention to the National Research Programs (NRP), the second and oldest directed research initiative, because the NRPs primarily pursue a logic of social problem-solving rather than one of scientific excellence and competition.

Directed research is a term requiring explanation, because the political definition of a research objective is intrinsically linked to the Swiss political system. Firstly, we need to note that SNSF is a foundation under private law, which was set up in 1952 with the mission to allocate funding for basic research. This funding is provided under the quadrennial federal research support budget. SNSF enjoys operational independence in allocating these funds, and neither the Federal Council nor Parliament may withhold funding from research deemed objectionable – they are limited to deciding the global amount of research funding. G. W. Bush's executive order of August 2001 prohibiting the NiH from funding research on newly derived human embryonic stem cells would, therefore, not have been possible in the Swiss context. In terms of accountability, SNSF may be characterized as a 'boundary organization' (Guston, 2001) in that its oversight body, the foundational council, is composed of representatives from the federal government and Parliament, the major Swiss institutions of higher education, the academies of science, and the economy. As one

among many stakeholders the federal government lacks unilateral veto power.[22] We need to add that such an institutional setup – known as para-governmental or subsidiary policy implementation – is not uncommon in Switzerland, which has a strong tradition of delegating policy implementation from the federal government to the cantons or even to private actors (Kriesi and Trechsel, 2008: 124).

Secondly, the definition of topics to be investigated by NRPs is not a straightforward process, but reflects the negotiated character of policy formulation in Switzerland. After the 1960s (marked by much activism in science policy), the onset of the 1970s saw a crisis of public finances and a more skeptical attitude towards the utility of scientific research. It was in this context that, in 1973, SNSF submitted a proposal to the Federal Council suggesting earmarking ten percent of the federal research budget for programs of social and political importance. SNSF hoped to secure its institutional legitimacy by demonstrating the social utility of research (Benninghoff, 2004; Freiburghaus and Zimmermann, 1985). Both the Federal Council and Parliament quickly embraced the proposal, and SNSF was tasked with its implementation only a year later.

Within SNSF, research funding is allocated by the national research council, which, as SNSF's operational arm, is responsible for the scientific evaluation of the funding proposals submitted by researchers affiliated with Swiss research institutions. The review process is carried out in separate 'divisions' (division I: humanities and social sciences, division II: exact sciences, division III: biomedical sciences). For the implementation of the NRPs, a division IV was set up and started operating in 1976. While the role of SNSF as the program implementer was unquestioned, there was competition between SNSF, SSTC, as well as the federal administration, to define the topics of inquiry for the NRPs. The final solution adopted was that these parties jointly perform this task under the auspices of the Federal Department of Home Affairs. After consultation with interested parties the Federal Council would then make the final choice (Freiburghaus and Zimmermann, 1985: 128ff.). This ar-

[22] Representation of the federal government in the national research council, SNSF's operational arm, was abolished in a 2002 reform, along with the foundation council's decision-making authority for funding proposals exceeding half a million Swiss francs. It does, however, retain a say in funding decisions of wider social and political importance. In the context of stem cell research regulation the old regulations matter since SNSF's decision to fund a research project on imported human embryonic stem cells was taken in September 2001.

rangement, however, did not lead to political capture of research priority setting, which, according to Braun and Leresche (2007: 743), has largely been a bottom up process. In practice, once the topic of a NRP has been defined by the Federal Council, researchers can submit project proposals with a thematic fit. Upon successful evaluation of the proposal, funding is provided for four years. An ad hoc expert group is established by SNSF for each new NRP, which accompanies implementation. About 70 programs have been authorized to date, encompassing a very broad thematic horizon.

NRPs have important effects within the scientific community as well as in the context of application. Effects on the scientific community primarily result from the coordination of different research areas into a single field, thanks to a common umbrella and the training of young researchers. Effects on the context of application are also important, both in regards to commercial applications as well as public action. However, NRPs are confronted with multiple and concurrent expectations by different stakeholders, which Freiburghaus and Zimmermann (1985: 134) described as 'expectation excess'. A more recent evaluation report maintains that NRPs generate impulses towards solutions rather than ready-made solutions to technological and societal problems. Expectations in terms of policy advice should thus be directed at other research instruments, such as agency research. However, this does not preclude the relevance of NRPs for political problem solving, since they may engender longterm effects (Staatssekretariat für Bildung und Forschung, 2007: 18ff.).

5.5 Continuity and change in the advisory system

This chapter has investigated the institutional foundations of the Swiss political system, the public image of science in politics, and the organization of expertise supply. Keeping in mind that the evidentiary basis regarding processes and practices is much sparser than that on institutions, this discussion nonetheless enables us to create a synthesis of the Swiss advisory system. There is one key lesson from this survey: the contemporary Swiss advisory system no longer corresponds to the corporatist image derived from empirical research from the 1970s and 1980s (e.g. Freiburghaus and Zimmermann, 1985; Germann, 1991). However, not everything

has changed. By distinguishing between elements that have remained stable and those that have changed, we can draw out some lessons.

Several aspects of the advisory system have remained stable. Firstly, Switzerland remains a small federal polity. The small population entails that the ratio between the number of scientific experts to the number of policy problems is much smaller than in more populous countries, resulting in a smaller domestic expertise pool. Moreover, the strong position of the cantons in Swiss federalism contributes to the decentralization of expertise demand. There is a culture of organizational decentralization and fragmentation, which also applies to the university system and epistemic authority (e.g. the academies of science have, under international pressure, federated, but refused to merge); the small size of the country makes personal contacts more direct and favors informality; and experience-based expertise from industry and the public sector is valued. In fact, if advisory organizations have not been mandated by the federal administration, they have to share the same access channels to the political system as interest groups. The non-preferential treatment of advisory organizations by the political system is also manifest in political culture, which does not make an association between trust in the state and trust in science. This non-discrimination between experience and science-based expertise is not counterintuitive, given the scarcity of the latter.

Secondly, the capacity to mobilize scientific expertise is still strongly concentrated in the hands of the federal administration. The state finances most producers of scientific expertise, either through direct mandates or lump sum grants. Independently financed research organizations, such as think tanks, are rare, and political parties largely lack the means to be regular sponsors of expertise production (Freiburghaus and Zimmermann, 1985; Ladner, 2007: 84ff.). There is no evidence that the reinforcement of Parliament and the major political parties has had repercussions on this resource distribution.

Thirdly, while political polarization has increased, and shifts in partisan power have translated into the modification of the seat allocation in the Federal Council, the Swiss political system does not lend itself to power alternations such as those that occur in parliamentary systems of government. Instead, majorities are issue specific, and elections do not result in stop and go government. As some have

argued (Bussmann 1989: 28-30; Koller 1989: 225; Sager and Rissi 2011: 158-160; Freiburghaus and Zimmermann 1985: 84ff.), such a system is conducive neither to expertise production organizations (i.e. think tanks) serving as platforms for 'governments in waiting', nor to experts adjudicating between partisan platforms and coalition treaties.

Amid these continuities, change in the political system over the past two decades has also affected the advisory system. This particularly relates to the diminished importance of political inclusion during the pre-parliamentary phase of decision-making, and the reduced importance of extra-parliamentary commissions that has gone hand in hand with that. Not only is the number of extra-parliamentary commissions in decline (as is the number of policy proposals drafted by them), their members increasingly belong to a functional elite, with personal networks across different commissions and sectors of society becoming increasingly rare (Rebmann and Mach, 2013). This does not mean that the administration has stopped consulting scientific experts, but it suggests that how it does so has changed. Policy work has become more internalized, reducing the need for professors to contribute or to preside over expert committees that draft legislation. Instead, experts work under closer oversight, and with less public visibility. Although data is scant, such work is increasingly done by private consulting firms. Interview testimony suggests that their ascent has as much to do with changes in the science system reducing the availability of academic scientists as policy consultants as it does with consulting firms' reliability and professionalism. Their dominance, however, is limited to short term mandates, and academics are still the preferred partners for medium and long term research projects of the administration. The lesson from this is that Bussmann's (1989: 29ff.) analogy between academic engagement in government, and a public school teacher assuming responsibilities in a community's associational life after work hours, is holding less and less true. Expertise has become professionalized.

Increasing normative codification of advisory practice and legal transparency requirements are another changing variable in the advisory system. As elaborated, WTO public procurement guidelines have been adopted in Switzerland, and apply to the recruitment of experts. Parliament has enforced the publication of expert reports in a publicly accessible database. But many expertise mandates have a fi-

nancial volume small enough to escape public procurement guidelines, and while installing and staffing an advisory committee is now formalized, its sessions are generally not open to the public. Such are the rules, but how they come to influence advisory practice is yet to be seen.

Parliament and the political parties have not been endowed with further resources to mobilize their own scientific expertise. From that point of view, the control of expertise remains firmly in the hands of the administration. The question remains, though, if increased political polarization and media scrutiny is having an effect on scientific expertise. While there is no clear answer at this point, this discussion will be pursued in section 9.2.

In concluding this chapter I want to reiterate the assertion that the Swiss advisory system has experienced transformation over the past 20 to 30 years, and that these changes have moved it away from its former corporatist image through increased transparency and professionalization. The federal administration remains the dominant principal in expertise mobilization, and has likely further consolidated this position through the decline of the political system's informal core of political inclusion. While increasing politicization of expertise in the public realm is a possibility to be empirically confirmed, we have to keep in mind that policymaking still predominantly takes place at the pre-parliamentary phase, where informal cooperation remains strong (Sciarini, 2013). In addition, the transformations described likely vary in magnitude between different policy domains. We can end this discussion with the statement that Switzerland is and remains a political system in which cooperative decision-making remains important, with most resources necessary for mobilizing scientific expertise concentrated in the hands of the federal administration; but that we must keep an eye on whether, and how, political polarization and media scrutiny affect the mobilization of scientific expertise.

Six

Regulating Stem Cell Research

6.1 Introduction

This chapter is about the making of stem cell research regulation by the Swiss federal government and the role of scientific expertise therein. It was the summer of 2001 that an imminent policy decision by the Swiss National Science Foundation (SNSF) on stem cell research became engulfed in political controversy. In early 2000, Marisa Jaconi and Karl-Heinz Krause from the University of Geneva's 'Laboratory of Biology of Aging' had submitted a funding proposal to SNSF for studying the differentiation mechanisms of human embryonic stem cells (hESC). This proposal not only prompted an extended review process at SNSF (scientific, legal, and ethical), it also led SNF's governing council to prepare a declaration of principle in support of such research.

Human embryonic stem cells, first derived in 1998 at the University of Wisconsin (Thomson et al., 1998), have two interesting properties. They have the ability to replicate at a high rate through division without showing signs of aging, and they have the potential to differentiate into any of the 200 or so known types of cells found in the human body. The biomedical research community construed the (then still experimental) ability to deliberately control the differentiation process of an embryonic stem cell into a cardiac or nerve cell, or the future possibility of engineering an entire tissue, as the advent of a new medical paradigm – regenerative medicine – out of which cures for conditions like Parkinsons might be developed. However, as their name suggests, the researcher extracts human embryonic stem cells from an approximately five days old embryo in the blastocyst stage, which is a fatal procedure. There was no disagreement about the desirability of cures against degener-

ative diseases like Parkinsons or Alzheimers. However, destroying embryos in the name of science was prone to contention, not just in Switzerland. Parallel debates took place at the same time around the world, notably in the US, the UK, Germany, and France.

Controversy erupted in Switzerland after a MP – tipped off by an investigative journalist – introduced a moratorium bill in Parliament (later defeated), just weeks before SNSF took its decision. The National Commission on Biomedical Ethics (NACBE) also issued a statement pleading that SNSF ought to withhold a decision until appropriate public debate on aims and means of stem cell research had taken place (Nationale Ethikkommission im Bereich Humanmedizin, 2001a). Nevertheless, SNSF followed through with its decision. It also called on the legislature to create an unambiguous legal basis for stem cell research. After a brief public uproar against SNSF,[1] the federal government set to work and presented a draft 'embryo research law' only a few months later for public comment, treating importation and domestic derivation of human embryonic stem cells. Parliament largely followed the governmental draft and adopted the law with some modifications on December 18, 2003. Subsequently a referendum was initiated and a popular vote took place on November 27, 2004, in which Swiss citizens backed the law with a two thirds majority.

It is important to acknowledge that this case study differs from the other two in one important point: regulating stem cell *research* implicates elements of the scientific community as target population of public policy. Moreover, regulatory policies – whereby the state prescribes a certain conduct – aimed at the scientific community are a rather rare infringement of science's traditional self-regulatory autonomy. Considering the role of scientific expertise in stem cell research policymaking necessarily implicates scientists in the capacity of stakeholders and engages the debate about the nature and adequacy of the state–science relationship. As this chapter will show, these science-policy elements are present throughout the case as different normative visions about science in society come to substitute the traditional partisan left-right structure of political conflict.

[1]The green party demanded the resignation of SNSF research council president Heidi Diggelmann and Federal Councillor Ruth Dreifuss qualified SNSF's decision as 'based on reasonable reflection, but taken in a rush and lacking political tact' (Masmejan and Vos, 2001).

This chapter is structured as follows. The first part looks at constitutive elements of the overall action situation that exerted a strong structuring effect, but did not originate in the situation itself. This includes the science of stem cell research, the domestic biomedical policy subsystem, and the international policy response to human embryonic stem cell research. The second part analyzes actors that mobilized scientific expertise and explores their commitments in the policy arena. This includes the Swiss National Science Foundation, the Federal Administration, the National Advisory Council on Biomedical Ethics, the Center for Technology Assessment TA-Swiss, and the political parties. The third part looks at sites where negotiations involving expertise took place. This comprises the consultation procedure, the parliamentary deliberation process, and the referendum campaign. Finally, I draw conclusions. For this purpose I establish the nature of the policy issue as it transpired from the analysis and then go on to identify the conditions of expertise mobilization and the effects the latter produced.

6.2 Constituting elements of the action situation

The overall action context of stem cell research policy deliberation comprises a fair share of elements that are not the product of concrete action situations within the decision-making process, but originate elsewhere. They have nonetheless been a strong structuring influence on decision-making about human embryonic stem cell research. This notably concerns the science of stem cell research itself, which I discuss at first. Following this, I turn to the Swiss constitutional and legal framework of biomedicine, against which policy-makers sought to articulate the political implications of human embryonic stem cells. Finally, I characterize the influences that the stem cell controversies in other countries – notably Germany – exerted on the Swiss debate.

The science of stem cell research

When stem cell research became a political issue in the early 2000s, it was at a very precocious stage and predictions about potential applications and timelines were speculative. The political debate largely focused on stem cell *research* as such, rather

than its potential medical applications. This stands in stark contrast to recombinant DNA research where primarily the technological application – genetically modified organisms – drew most attention. The goal of stem cell research to cure diseases like Parkinson's was largely welcome and only few persons leveled criticism at the broader emerging paradigm of regenerative medicine.

The acquisition of basic notions of stem cell biology has proven to be inevitable for the analyst; the advisory recommendations and political arguments deployed could not have been made sense of otherwise. I briefly present them here, as an illustration of the issue complexity politicians were confronted with, few of whom had a background in biology.

In the human body we find three groups of stem cells: embryonic stem cells, primordial germ stem cells, and adult (or somatic) stem cells. They are of different origin and *potentiality.* The latter term describes the scope of possible differentiation of a stem cell kind. A fertilized egg cell, for instance, is *totipotent* for it can develop into a full individual. Embryonic stem cells are assumed to be *pluripotent*, meaning that they can differentiate into any type of cell, but cannot form a complete individual.[2] Adult stem cells are believed to have the ability to differentiate into a limited subset of cells of the organ in which they have been found (multipotency). However, whether or not adult stem cells have the ability to *trans*differentiate into a cell type from another organ (cardiac stem cells forming liver cells, for instance), has been the source of great controversy. Normal cells cannot change into another cell type and this unipotency sets them apart from stem cells.

Stem cells can produce other kinds of cells, which is of great interest to medical research, for they open up the possibility of a regenerative approach to medicine. Human stem cell based therapy concepts have been discussed for diabetes mellitus, pathologies of the central nervous system (Alzheimer's, Parkinson's, paralysis, etc.), coronary heart diseases, and autoimmune diseases.

Stem cell research started in the early 1960s with the discovery of hematopoietic stem cells in the bone marrow of mice. Hematopoietic stem cells are cells capable of

[2]For ethical reasons it remains untested whether human embryonic stem cells are truly not totipotent for such an experimental proof would require the implantation into a human uterus. However, animal experiments suggest that individual germ cells are only totipotent until an 8 cell stage. Embryonic stem cells are derived at a much later stage and have failed in animal experiments to develop a placenta, indispensable for full development.

differentiating into any type of blood cell and thereby regenerating damaged blood cells. Stem cells with the same properties as hematopoietic stem cells have also been found in other organs like the skin, in certain cavities of the digestive tract, the heart and the brain. They are called 'adult' or somatic stem cells. They only exist in small numbers and are capable of differentiating into several different cell types found in their host organ.

In 1981, researchers managed to extract stem cells from mice embryo. They discovered the extraordinary ability of these embryonic stem cells to be capable of differentiating into any type of cell. By the mid–1990s, this property has also been confirmed in embryonic stem cells of primates. Human embryonic stem cells (hESC) have first been isolate in 1994. However, the big breakthrough came in 1998 when a team of researchers not only managed to isolate hESC, but also to culture them and derive a cell line. In the same year, another team of researchers succeeded in the isolation and culturing of embryonic germ cells from aborted fetuses (Shamblott et al., 1998). These cells are found to have similar properties like hESC in terms of their ability to differentiate into any type of cell, but are less prolific than the latter (Cohen, 2007: 12–14).

Human embryonic stem cells are derived from the inner cell mass of a 4–6 days old embryo, called the blastocyst. The blastocyst is formed of about 200–250 outer cells that surround 30–40 inner cells. It is these inner cells that are extracted for the derivation of a human embryonic stem cell line. The extraction process damages the embryo and kills it. The hESC are placed on a feeder medium and a growth factor is applied. They continue to divide without differentiating into other cells (Cohen, 2007: 21–22).

Embryos from different sources may be used for derivation. Stem cell lines are mostly derived from embryos which have been created for in vitro fertilization treatments (IVF) but have not been implanted for some reason. They are referred to as 'spare' or 'supernumerary' embryos, a discursive classification subject to criticism. An embryo for hESC extraction may also be created specifically for that purpose, even though such practice is only legal in a handful of countries, such as the UK (Hüsing et al., 2002: Chap. 4).

More recently alternative methods of producing stem cells have been invented.

For instance, genetic reprogramming has enabled the transformation of pancreatic cells into insulin producing beta cells by forcing the expression of three critical genes (National Institute of Health, 2010). Similarly, researchers managed to reprogram cells into an embryonic stem cell-like state by forcing the expression of certain characteristic genes and factors. This has been accomplished for mice cells in 2006 and for human cells in 2007. Even though these 'induced pluripotent stem cells' (iPSC) resemble hESC, it is not clear if they behave in the same way in a clinical setting. However, iPSC solve the rejection problem since they can be produced from cells of the receptor (National Institute of Health, 2009).

Affordances of the domestic biomedical policy subsystem

Because of the involvement of the human embryo, the stem cell research issue became instantly entangled in the Swiss legacy of biomedical policy-making dating back to the late 1980s. That legacy is composed of constitutional article 119 (henceforth Const. art. 119, cf. section A.1), which, during the relevant timeframe, was the key provision on reproduction and genetic technology relating to the human. It came into being as a governmental counter proposal to the popular initiative *Against the Abuse of Biotechnology and Assisted Reproductive Technology*, launched by a committee around the consumer advocacy news publication *Der Beobachter* [The Observer].[3] This committee retracted its proposition in favor of the more moderate governmental proposal, which nonetheless made substantial concessions to the initiative. The Swiss people accepted the counter proposal in 1992. Then, an interagency working group (IDAGEN) was set up to elaborate legislative proposals that would further detail the application of this constitutional provision in terms of specific laws.[4] Amongst other things, this group proposed the creation of a governmental ethics committee as an observer of the fast changing biotechnological landscape. In the meantime, though, another popular initiative was launched that sought to reverse the 1992 constitutional amendment ('Initiative for Procreation Respecting Human Dignity'). This time, the government presented an *indirect* counter proposal in

[3] It was a journalist of the same publication that alerted a MP about SNSF's impeding stem cell research decision (Interview X).

[4] IDAGEN stands for 'Interdepartementale Arbeitsgruppe Gentechnologie'. Its report was issued in January 1993 (cf. Schweizerischer Bundesrat, 1996: 216).

the form of the 'Federal Act on Medically Assisted Reproduction' (FAMAR) as one concretization of Const. art. 119.[5] FAMAR was accepted by Parliament in 1998, but could not be enacted until the initiative was voted on the ballot in 2000, where it failed (Rothmayer, 2006: 598–9).

Const. art. 119 and FAMAR turned out to be relevant for the stem cell decision-making process in two distinct ways. Firstly, they articulated a legal framework that (by omission) provided for the importation of hES cell lines and tied the debate around the domestic derivation of hESC to medically assisted reproduction and in vitro fertilization (IVF) by stipulating a ban on all forms of cloning as well as on the use of IVF for research purposes. This legal framework further brought into being the 'supernumerary' embryo as a contested, but possibly legal source for domestically derived hESC. As we shall see, the work of constitutional expertise was an important agent in articulating these factors for the debate. Secondly, this legal framework established the National Advisory Committee on Biomedical Ethics (NACBE) (FAMAR art. 28). Moreover, the making of these legal provisions brought into being a biopolitical subsystem by constituting a number of *ad hoc* advisory bodies and fora for policy formulation.[6] Some of these actors became deeply engaged in the stem cell case. Moreover, through the publication of a scholarly analysis of Const. art. 119, Prof. Rainer J. Schweizer, whom we will meet later, established himself as the dominant constitutional expert on biomedical issues. Knowing his written interpretation of Const. art. 119 prompted the federal administration to mandate him with a report on the legal foundation of stem cell research (Interview IV, for the report see Schweizer 2002a).

The project of human subject research regulation also exerted a path dependent effect. While at early project stage during the stem cell research controversy, it would later lead to the creation of a dedicated constitutional article (Const. art. 118b)[7] as well as the Federal Act on Research involving Human Beings (FARHB). In 1997 MP Rosmarie Dormann introduced a motion asking government to propose

[5] Since a popular initiative necessarily has to take on the form of a constitutional provision, a direct counter proposal would have to do the same.

[6] The governmental dispatch detailing the legislative proposal on stem cell research provides a list of these committees with their past findings (Schweizerischer Bundesrat, 2002).

[7] The need for such a constitutional provision was first articulated by the council of states' committee on science, education, and culture, as it debated the stem cell research act.

such a law, for she deemed FAMAR (still in gestation at that time) not sufficiently detailed on research issues. After a procedural hiccup, the Federal Office of Public Health (FOPH) was at last empowered to assemble a project team and begin work in 2000.[8] FOPH originally planned to address stem cells within the same bill. However, when the Federal Council later decided to make a dedicated law regulating research with hESC, it could simply mobilize the personnel resources FOPH had build up for the FARHB project.

Finally, the popular 'Initiative for the Protection of Life and Environment Against Genetic Manipulation', although rejected on the ballot in 1998 (Votation No. 440, BBl *1998* 4363), exerted a structuring and constitutive influence on the action situation of interest. If accepted, this initiative would have imposed a near-total ban on transgenic research and technologies. It was a wakeup call for the scientific community and a reminder that scientific research is not a neutral economic production factor (Interviews V and VI). Not only was the memory of this near science policy catastrophe still vividly present among decision-makers at SNSF when the stem cell research issue was deliberated, it also informed and provided the organizational infrastructure for government's strategy in dealing with stem cell research legislation. This infrastructure consisted of the foundation *Science et Cité* – literally 'Science and Society' – which then Secretary of State for Science and Education Charles Kleiber established in cooperation with public and private science policy stakeholders (Wehrli, 1999). The intent behind the foundation was to prevent a future clash between direct democracy and the scientific community by strengthening the Swiss citizens' awareness about what science is and how it works. This was to be accomplished through the organization of public dialogue events, such as science and cafés and fairs (Interview V). When the federal government announced its intention to prepare a special stem cell research bill, it also promised a public dialogue initiative organized by *Science et Cité* (Bundesamt für Gesundheit, 2001).

[8]The motion first expired because it was not deliberated in time, but was renewed by physics professor and member of the council of states Gian-Reto Platter (social democrat), upon which it finally passed a parliamentary vote and was received by the government in December of 1999.

Foreign policy deliberation as a resource

In addition to domestic path dependencies, international developments added their share of structuring elements to the Swiss policy formulation process on stem cell research. The international expansion of research employing human embryonic stem cells after 1998 led to a series of national policy responses in countries like the UK, the US, Germany, and France. These developments were publicly known in Switzerland, for the news media began covering stem cells long before the issue attained domestic saliency. Later, the federal administration, as well as the advisory bodies TA-Swiss and NACBE, established summaries of international policy developments (cf. Schweizerischer Bundesrat, 2002; Hüsing et al., 2003; Nationale Ethikkommission im Bereich Humanmedizin, 2002).[9]

For the federal government and FOPH, knowing about different policy options served as a compass for the value controversy at stake, which could potentially take on different shapes in different linguistic areas of the country. Moreover, knowing what other countries were up to allowed for an assessment of whether a stringent policy option would be detrimental to the competitiveness of Switzerland's research and innovation sector (Interview III).

But more defining than a regulatory impact assessment was the availability of information engendered by the international debate, especially the German one. In its internal decision-making, SNSF consulted closely with the German DFG on the general direction to pursue so as to prevent the position of one organization being pitched against the other in the German and Swiss political debates (Interview I). Moreover, because of the shared language and the slightly earlier start of the German debate, Swiss politicians had access to a wide range of information on which they could draw for a general understanding of the matter as well as for arguments. For instance, Interviewees VI and X declare having relied on literature produced for the German context in order to gain a fundamental understanding of the issue. Further, the parliamentary group of the Green Party established adult stem cells as a viable alternative to embryonic ones, even before SNSF announced its final deci-

[9] An entire chapter of the dispatch was dedicated to the international comparison, which FOPH mandated from a University of Basel law school PhD candidate (Interview IV). A request for such a comparison was also submitted in Parliament (cf. Question Gutzwiller, 01.3530).

sion,[10] and social democrats introduced other arguments drawn from the German debate during parliamentary committee deliberation. Finally, the advisory report by the technology assessment advisory body TA-Swiss (Hüsing et al., 2002, 2003), to be discussed at a later point, drew on the German ethical discourse, as both its lead author and the author of the ethics chapter are Germans employed by German research organizations. Based on this evidence, it is doubtful whether Swiss political actors would have had the resources to develop, on their own terms, the framing of adult stem cells as viable alternative to their contested embryonic sibling.

6.3 Actors and commitments

The preceding section identified a set of elements constitutive of the stem cell research policy arena that originated outside of it. This section now turns to the scientific expertise mobilized in that context. It discusses the collective actors implicated in policy formulation and the mobilization of scientific expertise. These actors are the Swiss National Science Foundation, the Federal Office of Public Health, the National Advisory Commission on Biomedical Ethics, the Center for Technology Assessment TA-Swiss, and the major political parties. The analysis strives for a clarification of each actor's commitments in the stem cell research policy arena. This includes a reconstruction of the actors' perspectives – their perception of the situation – as well as the description of their self-assigned position regarding policy formulation. This analytical work exploits these collective actors' internal decision-making processes regarding hESC research and draws on their organizational history.

A summary of mobilized expertise

Table 6.1 provides an overview of all instances of scientific expertise mobilized during policy formulation. It is grouped by the producer of the different expert opinions and provides indications about the addressed issues, the means of communication and diffusion, its sponsor, as well as the addressed publics. The table's substance will be discussed throughout the entire chapter and I consequently forgo further discussion at this point.

[10] Menschliche Embryonen als Rohstoff für die Forschung? (CuriaVista 01.3436).

Table 6.1: Scientific expertise produced within the stem cell research policy arena

Producer	Issue	Communication	Principal	Publics
National Ethics Commission	Construction of hESC as pol. issue; delimitation of policy alternatives	2 reports; press releases, media appearances; commentary of gov. policy proposal; information event and policy brief for Parliament; participation in parl. committee hearing	Self	Biomedical community, Parliament
TA-Swiss	Biomedical, ethical, legal & economic implications of hESC	2 reports; press releases; commentary of gov. policy proposal; information event and policy brief for Parliament; participation in parl. committee hearing; public engagement event	Self	Stakeholders & public at large
Prof. Rainer J. Schweizer	Determination of regulatory scope under existing legal framework; patenting of hESC	Published report; 2 newspaper commentaries; participation in parl. committee hearing; written and oral advice in parl. committee deliberation	FOPH; self; Parl.	Gov. & Parl.; stakeholder debate
Prof. Olivier Guillod	Legal implications of Jaconi/Krause proposal	Report to SNSF	SNSF	SNSF
Various stem cell researchers	Stakeholder perspective	Hearings in parliamentary groups and committees; numerous public presentations	Self	Parliament, public at large

The Swiss National Science Foundation

The Swiss National Science Foundation (SNSF) was arguably the key actor in putting human embryonic stem cell research on the policy agenda. As mentioned in the introduction, it was through a specific funding proposal that SNSF took up the issue.

SNSF is a private law foundation which implements federal science funding policy. It operates under a delegation mandate that affords operational independence. This mandate is periodically reviewed with the quadrennial research funding budget. Overviewing SNSF's operation is a foundation council with mixed representation from scientific, political, and private sector institutions. It meets twice a year to discuss strategy and science policy. Moreover, it elects the presiding members of the research council's four operational divisions. The foundation council's operational prerogatives, however, are slim and extended to the approval of extraordinary

large grants (a prerogative now revoked), as well as deliberating funding decisions of political importance.

The Jaconi/Krause project proposal was not ordinary business for SNSF, as the research council's unusual review process demonstrates. The division on biomedical research positively evaluated the proposal's scientific merit. Further, it sought the ethical appraisal of the University of Geneva research ethics commission as well as the Swiss Academy of Medical Sciences' (SAMS) ethics body, the Central Ethics Commission. Both ethics panels signaled compliance. SNSF's biomedical division also turned to University of Neuchâtel's Prof. Olivier Guillod for counsel on the legality of importing human embryonic stem cells, also yielding an affirmative answer (Modoux, 2001).[11] But the process did not end there. Instead, the research council's presidency, responsible for the approval of funding decisions, decided to involve the foundation council due to the politically sensitive nature of the case.

In its meeting of June 2001, the foundation council discussed the matter (Interview I), after which SNSF publicly declared its intention to postpone the funding decision until late summer in order not to preempt the political discussion about the ethical and legal aspects of stem cell research. It further announced its intention to consult with science policy decision-makers and declared the need for a comprehensive funding policy (Marco Iten, 2001). Subsequently, the nine-member presidency of the research council and representatives of the foundation council conducted a number of consultations in the run up to the foundation council's September meeting, in which the written policy position paper was to be voted on. Amongst others, the panel talked to the applicants (Marisa Jaconi and Karl-Heinz Krause), as well as with Christoph Rehmann-Sutter, designated president of the freshly inaugurated National Advisory Commission on Biomedical Ethics (Interviews I and II).[12]

There was growing resistance to SNSF's timeline for voting on the policy statement and approval of the Jaconi/Krause proposal. For Federal Councillor Ruth Dreifuss, in charge of the research portfolio, there were no legal means to influence

[11] While there was no existing legal foundation to provide for stem cell derivation, importation, as long as not qualified as a commercial transaction, was unproblematic. The law only prohibited commerce with embryos, which stem cells are no longer regarded as once derived and cultured.

[12] In an interview with the French language daily *Le Temps*, published on August 22, 2001, Rehmann-Sutter said that Heidi Diggelmann, president of the research council, was very interested in NACBE's opinion, but that neither SNSF nor Secretary of State for Science and Education Charles Kleiber have officially solicited the commission's advice (Masmejan and Vos, 2001).

SNSF, for the latter is a private actor. But she could, and did, instruct her representative in the foundation council to demand an additional three to six months of time for public debate. In addition, MP Rosemarie Dormann introduced her motion in the national council demanding a moratorium on stem cell research until the planned FARHB would be completed (cf. section 6.2). Moreover, NACBE cautioned SNSF decision-makers in private as well as in a public statement – the very first statement of this new organization – that a decision taken before sustained political debate would be prejudicial and detrimental to the legitimacy of scientific research (Interview II, Nationale Ethikkommission im Bereich Humanmedizin 2001a). But SNSF remained intransigent and voted on the issue on September 28, 2001.[13] Inside SNSF it was felt that it was both the right venue to make such a decision, given that SNSF had been established as an *independent* organization (Interview I), and that waiting for a governmental decision would imply delaying stem cell research for several years given the slow pace of the Swiss decision-making process (cf. Hofmann, 2001c). Hence, provoking a public reaction was perceived as necessary (Interviews I, III, IV and VI). The latter was especially Fritz Schiesser's position. Schiesser, both president of SNSF's foundation council and MP in the Council of States, publicly defended this stance during the parliamentary debate of the stem cell research law.

> "We were aware that we made a decision, which inevitably had to provoke political reactions. When I look back now on what has happened since, then I have to say that SNSF's decision – which concerned a very small amount of funding compared to other research projects – has engendered discussions and also public action by the state. I am convinced that we would not be deliberating this issue today had SNSF not made this decision and also demanded that the state should issue corresponding legislation." (Fritz Schiesser, AB *2003* S 175; my translation)

The SNSF position paper (SNF Stiftungsrat, 2001) underscored the scientific importance of human embryonic stem cell research and vowed to fund future proposals, provided that they meet a list of outlined scientific, ethical, and legal criteria. Addressing the somewhat ambiguous legal situation, SNSF writes that

[13] During this board meeting the president of the biomedical section informed the foundation council of the scientific aspects of the Jaconi/Krause proposal, followed by an elaboration of SNSF's decision making process by Heidi Diggelmann and Fritz Schiesser. The position paper was approved with 29 yes, six abstentions and no opposing votes.

> "[our] position is of interim character. [SNSF] will adapt it when necessary to reflect new insights and framework conditions. It is in this sense that SNSF invites the legislator to regulate research with human embryonic stem cells as swiftly as possible." (SNF Stiftungsrat 2001, my translation).

Such legislation, it contended, should also provide for the domestic derivation of human embryonic stem cells from supernumerary embryos.

Interviewee VI recalls this episode as a struggle about who pilots Swiss science policy – SNSF or politics. Despite private and public criticism – the green party went as far as demanding Diggelmann's resignation (Hofmann, 2001b) – agitation quickly dissipated. By October 3, 2001, Diggelmann met informally with a group of MPs and government to discuss the decision and its political implications. SNSF, however, was not involved in the governmental decision-making process beyond that point (Interview I).

In conclusion, the course of events suggests that SNSF legitimated its actions primarily through its independent status, while at the same time claiming credit as initiator of the political debate. Thus, it appears that its institutional prerogative – backed by half a century of science policy through delegation – and not the legal scope to specifically fund research with imported hESC, served as dominant rationale in how SNSF addressed the controversy.

The federal government

The federal government picked up the stem cell issue where SNSF quit the scene as a somewhat contested proto-regulator of science policy. In the very short time span of two months, it developed the outlines of a legislative response to stem cell research in Switzerland. This strategy, backed by a Federal Council decision, was made public in a November 21, 2001 press release (Bundesamt für Gesundheit, 2001). It encompassed the creation of a dedicated stem cell research law with the purpose of subjecting the issue to institutionalized treatment, opening up the usual avenues of contestation through the consultation procedure, parliamentary deliberation, and a potential referendum. Moreover, it announced a public engagement initiative, to be carried out by the foundation *Science et Cité*. The press *communiqué* reveals only indirectly that this strategy was rooted on substantial work of consti-

tutional interpretation, which delineated a blind spot in the constitutional map regarding biomedical research. Through maintaining that this spot existed, it became possible to argue for legislation that could eradicate it, without having to engage in the lengthy business of constitution making.

Procedural commitment

Unlike its rigid overall structure (cf. chapter 5), the federal administration is a shape-shifter when it comes to preparing legislative business. It forms project teams for that purpose, possibly with members from different agencies, but led by a single principal. Thus, who the federal administration is as an actor and what interests this actor pursues is to some extent issue specific. Const. art. 119 and FAMAR, the centerpieces of biomedical legislation at the time, had been crafted under the direction of the Department of Justice's Federal Office of Justice (FOJ). But the Federal Department of Home Affairs' Federal Office of Public Health (FOPH) was ultimately in charge of its implementation. This division of labor had proven unsatisfactory and when work on FARHB commenced, it was decided that policy drafting and implementation should no longer be construed separately. Thus, the biomedical portfolio was shifted to FOPH, with FOJ maintaining a consultative voice (Interview III). This meant that Federal Councillor Ruth Dreifuss, a social democrat, was now spearheading biomedical policy.[14] Thus, by the time the stem cell research controversy materialized, the FARHB project had already brought into being an entire organizational infrastructure.

The federal government was in a reactive position. Amongst others, stem cell and embryo research were issues thought to be addressed in the FARHB project, which in late 2001 was still in an exploration phase with a relatively open schedule (Interview VI). Interviewee III declares that the Federal Council was not keen to take a decision, but that it was required to articulate a position in response to a series of petitions submitted in Parliament.[15] Moreover, there was SNSF's overt

[14]The State Secretariat for Education and Research (SER), then also part of the Department of Interior, contested FOPH's leadership on research issues, arguing that such matter would fall within its domain of responsibility. But just as SER lost out to FOPH in the case of regulating physician training, as well as FARHB, its bid to lead the stem cell research act failed, too (Interview VI).

[15]For instance, parliamentary initiative Dormann (Curia Vista 01.441) called for a moratorium on destructive embryo research until the enactment of FARHB, and Motion Schmied (Curia Vista 01.3531)

call for enabling legislation. Federal Councillor Dreifuss accorded a high priority to the project. Interviews III, IV, and VI portray her as 'research friendly' and as 'not being a big fan' of regulating scientific research. Interviewee III contrasts this position with Pascal Couchepin's more ambiguous stance,[16] who succeeded Dreifuss as Federal Councillor and head of the Department of the Interior.[17] Dreifuss, however, was convinced that a new branch of research requires political legitimacy, lest it would provide grounds for public fears (Interview VI). For that purpose she perceived the need for public debate, which, in her opinion, was best engaged by starting a decision-making process serving as a public engagement platform. In fact, a similar procedural choice already informed the regulation of *xenotransplantation*,[18] which had been dealt with separately and ahead of a comprehensive bill on transplantation medicine in order to enable political debate on this potentially controversial medical technology. Thus, Dreifuss wanted a swift legal response, without it being an *urgent* response. This distinction is important – it was repeatedly asserted during debate on the floor and in committees of Parliament – for an urgency law cannot be challenged by a popular referendum.

After the decision had been taken to divorce the stem cell issue from the larger human subject research context (with the possibility of later reunification), the resources for FARHB at FOPH were reallocated to the stem cell research initiative, described as a fluid transition (Interview IV). A steering group was formed overseeing the project, consisting of the directors of FOPH and SER, FOJ's deputy director, and a retired scientist from the University of Bern. Subordinate to this committee was the actual policy team, which gradually grew as one person after another joined the interdisciplinary team. Verena Schwander, a constitutional lawyer specializing in the question of academic freedom, whom FOPH originally hired for FARHB, led the four person team. Those external to the federal administration, such as legal expert Prof. Schweizer, were not part of the formal project organization. Henceforth,

demanded an urgent law banning the importation of human embryonic stem cells.

[16] Reportedly, his views became increasingly conservative during the enactment of the executive ordinance detailing the implementation of the law, as well as during the elaboration of HSRA under his direction.

[17] While Dreifuss was in charge of drafting the law, she retired by the time it was introduced to Parliament and subsequently it was Couchepin who represented the Federal Council's position in Parliament.

[18] Amendment of the Federal Decree on the Control of Blood, Blood-derived Products and Transplants (Curia Vista 98.035).

each person contributed to the project according to her disciplinary specialization, a process that took place under significant time constraints (Interview IV).

By the time FOPH made the Federal Council's plans for a dedicated stem cell research act public on November 21, 2001, the project had already taken a defining stance on important material issues which were to remain constant until the legislative proposal was delivered to Parliament. On the same day, the Federal Department of Home Affairs also delivered its official reply to several motions on the issue submitted in Parliament.[19]

Policy formulation took place entirely behind closed doors. The finalized proposal was only released to the public when the Federal Council decided to initiate the habitual consultation procedure, beginning on May 22, 2002. However, judging from a press report in *Le Temps*, the general direction of the policy proposal could be inferred from public comments made by Ruth Dreifuss and Charles Kleiber, as well as the known limitations imposed by the existing legal framework (Masmejan, 2002).

Policy alternatives

When FOPH embarked on the stem cell project, all actors agreed on the fact that importing and performing research on hESC in a non-commercial context was constitutional. Nobody challenged this fact, which Prof. Olivier Guillod's legal expertise for SNSF had uncovered. However, opinions diverged over how to deal with it. After all, it was more the product of a constitutional accident rather than the outcome of deliberate design: isolated and *in vitro* cultivated human embryonic stem cells simply did not exist when the Swiss biomedical regulatory framework was established. Some wanted to close the constitutional gap history had opened, either temporarily (e.g. National Councillor Rosemarie Dormann) or indefinitely (e.g. National Councillor Walter Schmied). But even proponents like SNSF preferred an affirmative rather than passive legal foundation for research with human embryonic stem cells. Leaving things as they were was unsatisfactory for, as elaborated in the last section, it would have left a controversy unresolved. Moreover, importation

[19]Green parliamentary group interpellation 01.3436; Motion Schmied 01.3531; Question Gutzwiller 01.3530

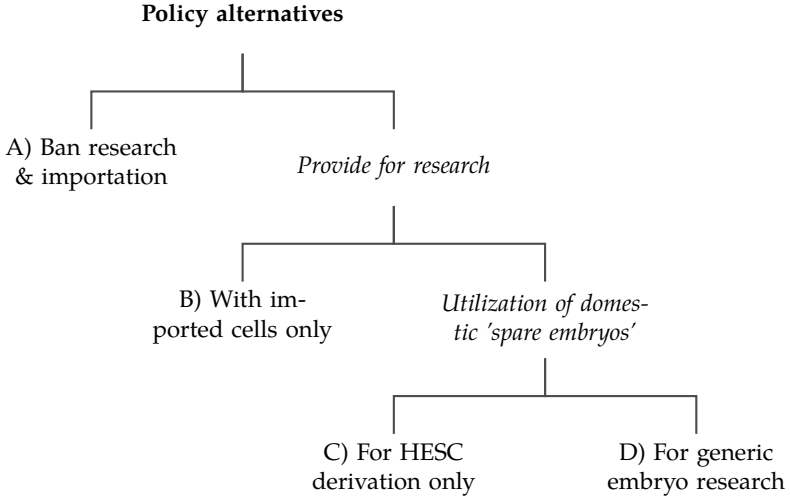

Figure 6.1: Alternatives of stem cell research regulation

created a double moral standard, because embryos had to be destroyed somewhere for stem cell derivation. All major actors (e.g. Dreifuss, SNSF, NACBE, TA-Swiss) acknowledged this ethical dilemma. This either left open exploring the legal ramifications of enabling domestic stem cell derivation, or taking the path toward banning hESC research altogether.

Pondering an enabling strategy, FOPH was quickly confronted with the embryo as a legal subject. More specifically, it required the determination of whether hESC research fell under existing legislation regulating medically assisted reproduction or constituted a new case. Interviewee III recalls that only following such an examination could one really decide if regulatory options were available that did not involve changing an existing law or even the constitution, for the latter would have implied a timeframe of five years or more.

Figure 6.1 illustrates the policy options FOPH considered. Option *A* was to draft legislation banning the importation of human embryonic stem cells. Should hESC research be permitted, option *B* could further concretize an importation-only solution, for instance in following the Germany policy design. Alternative *C* would only provide for derivation of hESC from a blastocyst, but no other embryo research, which would be allowed under possibility *D*. With the possible exception of option *B*, all scenarios would have required legislative action, but potential clashes with existing legislation were most salient for scenarios *C* and *D*.

The administration's policymakers generally favored alternatives *C* or *D*, due to the double moral standard problem of *B*. But as Interviewee IV recalls, a certain flexibility in terms of selecting a policy alternative was required. Ultimately, it was more important to end up with a solution rather than being defeated in Parliament or through a possible popular referendum. Thus, it was decided to devise an enabling but strict legislation. Importing, deriving, or doing research with hESC should be subjected to conditions that would prevent abuse and ensure that such acts are performed in pursuit of ethically desirable goals.

This strategy had been fully adopted by the time the draft law was submitted to public consultation in May 2002, and was followed throughout the remaining decision-making process. The draft *Embryo Research Act* FOPH presented to interested stakeholders provided for destructive research on supernumerary embryos.[20] This includes hESC derived abroad or in Switzerland, provided that they originate from supernumerary embryos only. Creating embryos for research purposes is prohibited and other sources of hESC that do not fall under the unconditional ban of cloning stipulated by the Constitution are to be regulated in the future FARHB, into which the present law should be eventually integrated.

Allowing for research implying the destruction of supernumerary embryos is justifiable, so the proposal, because such embryos have to be destroyed in compliance with FAMAR. However, the authorization of research with hESC is conditional on pursuing an ethically high-ranking goal, which cannot be reached with alternative and less ethically problematic means. Hence, the embryo *in vitro*, even when classified as supernumerary, has a right to the protection of its dignity; this, however, does not preclude weighing the value of such protection against the greater value of healing a sick person. Because such research is prone to abuse – and here we see the strategy of 'regulate swiftly but strictly' in order to preempt fears in the population – hESC research is tied to an authorization to be delivered by FOPH.[21]

[20] The following description is based on Schweizerischer Bundesrat (2002: 1235–1241).

[21] The law stipulates a number of strict conditions for this authorization:

- Research on supernumerary embryos is only to be authorized when aiming at improving IVF procedures or for gaining insights into human developmental biology. Such a research project has to conform to standards of scientific quality and has to be ethically justifiable. Supernumerary embryos may only be used for such research when its goals cannot be reached by alternative means. Spare embryos may not be commercialized, imported or exported, or developed beyond 14 days. Written and informed consent by the donor couple is required and persons

Interviewee IV explains that the law was drafted in the shape of a pyramid. Should its most extensive provision, research on supernumerary embryos until 14 days (option *D*), cause resistance, it could simply be eliminated from the draft without endangering the coherence of the law itself. The same also applied to the domestic derivation of hESC (option *C*). Indeed, Parliament ultimately decided to limit the bill's scope to provide for importation and domestic derivation of hESC only, but not for other kind of embryo research.

Articulating the supernumerary embryo

Let us return to FOPH's dealing with the central question about what scope the existing legal framework – namely Const. art. 119 and FAMAR – afforded for drafting legislation in support of the previously identified policy alternatives *C* and *D*. This is where FOPH turned to Prof. Rainer J. Schweizer, whom I have already briefly mentioned in the description of the biomedical legislative framework that preceded stem cell research policy-making. Schweizer was (and still is) a widely recognized authority on Swiss constitutional law with significant experience as an adviser to the federal administration and Parliament alike (Interviews IV and VIII). FOPH was familiar with Prof. Schweizer's writings, notably his commentary of Const. art. 119.[22] Because his co-author on that commentary, Peter Saladin, had passed away, Schweizer was virtually the only legal authority on that matter. This cognitive monopoly has to be assessed in the special context of constitutional expertise in Switzerland. In the opinion of Interviewee VII, constitutional commentaries produced by scholars such as Prof. Schweizer have special authority in the Swiss

performing IVF may not simultaneously be engaged in hESC research. The research has to be documented in a publicly accessible report.

- HESC may only be derived for research purposes and not for commercial purposes. Derivation is only authorized in conjunction with a research project, with an exception for future domestic research projects that would make a demand obvious. hESC lines have to be shared with other researchers in Switzerland who are in possession of an authorization. The rules of ethical acceptability, scientific quality, non-commercialization, subsidiarity, and publication of results equally apply to hESC research. Acceptable research objectives are defined as gaining insights relative to the diagnosis, treatment and prevention of severe illnesses, and relative to enlarging the understanding of human biological development.
- HESC but not embryos may be imported, provided they are derived under the same conditions also applicable for domestic derivation.

[22]Interviewee III describes the selection of experts based on the knowledge of their writing as normal practice in the federal administration.

political system, for the latter lacks either a constitutional court or a government-independent legal oversight body. Schweizer's cognitive monopoly was further reflected by the fact that he was also the author of the stem cell research technology assessment report's legal chapter, which we will come to discuss further below.[23]

There was relatively little chance for FOPH's stem cell research policy team to be surprised by Prof. Schweizer's findings – elaborated within weeks (Interviews IV and VII) –, for his publications enabled the general thrust of his argument to be gauged in advance. Moreover, the team's leader had obtained her PhD studying the constitutionality of academic freedom in Switzerland and was therefore well equipped to judge the legal situation. (She would later publish her own legal commentary in the daily *Neue Zürcher Zeitung* (Schwander, 2004a), as part of the media coverage leading up to the referendum vote on November 28, 2004, as well as in a professional journal (Schwander, 2004b).) Thus, Schweizer's commentary was more sought as an authoritative confirmation, rather than as an orientation in the face of uncertainty. As Interviewee IV elaborates,

> "In intractable questions – and I was aware from the start that this is an ethically and legally delicate question – being in possession of an external expert opinion from somebody with an academic affiliation, who roughly arrives at the same conclusion, facilitates the work of the administration." (my translation)

Two important conclusions emerged from Schweizer's (2002a) analysis of the existing domestic and international legal framework, which he exhaustively discussed with scholarly peers (Interview VII). First, the said legal framework was neither comprehensive nor conclusive on the question of destructive research on *supernumerary* embryos. Secondly, such supernumerary embryos have a special legal status. Because they lack a parental project, and FAMAR art. 5.3 mandates their destruction, they consequently do not enjoy a constitutionally protected right to life. But nonetheless, they are more than a mere object. Schweizer argued that the use of such supernumerary embryos for research purpose could be admissible under condition of parental consent and an explicit legal foundation yet to be crafted. To arrive at that conclusion, he established an analogy to organ donation and likened

[23] Interviewees III and VI identify a small expert pool as a generic problem in Switzerland. They do not see hiring foreign experts as remedy for the latter generally lack the necessary contextual knowledge about Switzerland.

the supernumerary embryo to a brain dead donor: neither has a chance for survival, they are not objects, and consent for donation of bodily parts is required in both instances. In essence, Schweizer suggested that destructive research, which includes the derivation of human embryonic stem cells, could be allowed in Switzerland without modifying existing legislation, but that a new law explicitly regulating such research would be required.

FOPH and the Federal Council fully embraced Schweizer's conclusion, and his language is evident in several policy statements (although not his name).[24] For instance, an extract of the November 21, 2001 press detailing the Federal Council's position reads:

> "The issue to be clarified by this is if and under which conditions supernumerary embryos and embryonic stem cells derived thereof may be utilized for research purposes. [...] The elaboration of and parliamentary debate on the assisted reproduction act took place before embryonic stem cell research had been moved into the spotlight of science. So far, this field of research has been neither *unambiguously* nor *conclusively* regulated in Switzerland." (Bundesamt für Gesundheit 2001, my translation and emphasis).

The trope 'neither unambiguously nor conclusively' [*weder eindeutig noch abschliessend*] also figured prominently in the dispatch the Federal Council submitted to Parliament.[25] Moreover, the Federal Department of Homeland Affairs also used it in its official answer to dispute claims made in Parliament that the existing legal framework would not allow for legislation without first amending legislation.[26]

Key to FOPH and Schweizer's legal interpretation was the use of a historical and contextual, rather than literal, reading of Const. art. 119 and FAMAR. This was indispensable to refute the argument that FAMAR art. 5.3 had already banned hESC derivation. It reads: "Extracting one or several cells from an embryo *in vitro* and their analysis is forbidden." (original emphasis). It was necessary to demonstrate that when the legislator deliberated and voted Const. art 119 in 1992 and FAMAR

[24]Schweizer and FOPH would later disagree on the exact affordances of this position, with Schweizer recommending the exclusion of policy alternative *D* from the bill.

[25]"Hingegen ist bisher die Frage der Verwendung überzähliger Embryonen zu Forschungszwecken weder eindeutig noch abschliessend geregelt. Sowohl die Bundesverfassung als auch das Fortpflanzungsmedizingesetz lassen es offen, ob überzählige Embryonen für die Forschung, namentlich für die Gewinnung embryonaler Stammzellen, verwendet werden dürfen." (Schweizerischer Bundesrat, 2002: 1165).

[26]Motion 01.3531 (Walter Schmied) and interpellation 01.3436 (parliamentary group of the Green Party).

in 1998, it did so exclusively with human reproduction in mind. FAMAR art. 5.3 was meant to prohibit preimplantation diagnosis, a procedure clearly geared toward reproduction, and not research.The only provision Const. art. 119 made that could be extended unambiguously to a research context was a total ban on any form of cloning. This meant that any domestic human embryonic stem cell derivation project would need to use spare IVF embryos.

As previously discussed, it was the legal framework that brought these 'supernumerary embryos' into being as an inevitable byproduct of IVF treatments. They are embryos that for some reason cannot be implanted into the uterus and are therefore legally subjected to destruction because donation to another couple as well as cryoconservation for later use are banned. This also concerned embryos already frozen before FAMAR was enacted. These *altrechtliche Embryonen* [i.e. pre-FAMAR embryos] were to be destroyed by the end of 2003. While the existence of these kinds of embryos was generally recognized, there was little certainty about their number, as well as about the usability of pre-FAMAR embryos for hESC derivation due to their age. But this uncertainty only arose during parliamentary deliberation amidst strong interest of the scientific community in gaining access to them. What to do about them was not so much a question of disputing the principle of Schweizer's analogy to transplantation medicine, but of differing value conceptions of the moral status of the early embryo.

In conclusion, even though Schweizer's work set the standard of constitutional interpretation – only contested by two peers – and left substantial traces in FOPH's articulation of the issue, the federal government did not actively justify its scope and motive of action in reference to that work. Instead, it was more of an insurance, which would protect the overall strategy of conflict settlement through legislation against potential criticism.

The National Advisory Commission on Biomedical Ethics

The National Advisory Commission on Biomedical Ethics (NACBE) is another actor whose commitment in the stem cell research policy arena is to be assessed here. It advises the federal government on medical and biomedical issues. Officially inaugurated by the Federal Council in July 2001, NACBE was immediately confronted

with SNSF's impending funding decision about Switzerland's first research project with hESC. Even before NACBE held its very first work meeting on August 31, 2001, its designated president was invited by SNSF's governing board to an informal hearing (Interviews I and II).

NACBE falls within the 'extra-parliamentary' class of advisory organizations previously described in some depth (cf. section 5.4). This means that institutional rules govern its membership and remit.[27] The Federal Council designated NACBE's 21 founding members *ad personam*, based on nominations by the federal administration. NACBE members have to have a background in either ethics, healthcare, or the sciences, and should represent the entire range of ethical positions. According to Interviewees II and XI, this value pluralism was genuinely present, especially in the stem cell debate. NACBE's legally defined remit (VNEK art. 1) encompasses

- monitoring of developments in human medicine and biotechnology,
- informing the public about the ethical implications of human medicine and stimulating public debate,
- elaborating recommendations for medical practitioners,
- preparing and providing advice to the federal government, Parliament and the cantons when requested.

Under its first chairman Christoph Rehmann-Sutter, NACBE conceived of itself as a non-representative institution (Interview II). Rather than assisting the federal government in the formulation of policy alternatives, it preferred the role of identifying fundamental normative questions. Especially in its exhaustive commentary on stem cell research (Nationale Ethikkommission im Bereich Humanmedizin, 2002: 61), to be discussed below, it drew a clear boundary between its advisory activity and what it considered to be questions resolvable by democratic institutions alone.[28] This position was also evident in NACBE's policy to seek internal consensus, but to clearly communicate persisting minority opinions. It deliberately refrained from disclosing vote counts or individual members' positions, though. Nevertheless, members were free to express themselves in public and the positions

[27] FAMAR art. 28, as well as executive ordinance VNEK (SR 810.113).

[28] NACBE explicitly stated that in a democracy, the legitimacy of a public regulation depends directly on the quality of public deliberation and the conformity with procedural norms.

of the commission's most prominent members were publicly known through numerous media appearances (e.g. Baumann-Hölzle, 2002; Fischer, 2002; Rehmann-Sutter, 2002). When the Parliamentary Committee on Science, Education, and Culture later convened hearings on stem cell research, it invited individual NACBE members rather than soliciting NACBE's opinion as a commission (Interview II).

Returning to the stem cell case, NACBE used its *inaugural* meeting to draft an emergency statement, urging SNSF to hold off with its decision for the sake of allowing an in-depth public debate. On September 19, 2001, NACBE released this six-page statement to the press and simultaneously published it in the Swiss Medical Weekly (Nationale Ethikkommission im Bereich Humanmedizin, 2001b). The purpose of this statement, Interviewee II recalls, was to remind SNSF and the scientific community that the moral status of the early embryo is a legal issue, not to be decided by an interested party. The statement warned that a decision taken by an interested party (SNSF and the scientific community) on a question spanning beyond science (the moral status of the embryo), based on a legal foundation in need of clarification, would constitute a potentially irreversible precedent that could be seen as an illegitimate act of power violating democratic procedural norms, with ultimately damaging consequences for the public reputation of the scientific community.

As we know, this statement did not prevent an affirmative vote of SNSF's foundation council. But NACBE didn't leave it at that. Instead, it started elaborating a second, and more in-depth statement, which it published during the governmental consultation procedure on FOPH's draft law. It also officially commented on that draft. While NACBE is formally independent, it is administratively attached to FOPH, which also hosts its secretariat.[29] However, FOPH and NACBE pursued two different goals in the stem cell case. To borrow Andy Stirling's (2005) terminology of 'closing down' vs. 'opening up', FOPH's strategy was to find closure to the controversy, while NACBE persisted with its efforts well beyond the Federal Council's decision to submit the draft law to Parliament.[30] It also organized an in-

[29] Interviewee II sees this link as enabling for the communication between the organizations, which, for instance, was not given when NACBE collaborated with FOJ, part of whose activities also concern NACBE (e.g. euthanasia).

[30] The act of remitting the dispatch to Parliament is the ultimate closure of the executive's stance on a policy issue. After that point, the federal administration assumes an advisory function for Par-

formation event for MPs (cf. Hofmann, 2003a) and prepared a leaflet containing six discussion points for the parliamentary debate. Interviewee II recollects that this persistent opening up irritated some people inside FOPH at first, as they implicitly assimilated NACBE to be part of the administration. Clarifying discussions, however, set the record straight.

The supernumerary embryo was the core subject of NACBE's ethical assessment published for the consultation procedure and later summarized for parliamentary debate (cf. Nationale Ethikkommission im Bereich Humanmedizin, 2002). It construed hESC research as intimately linked to IVF, but argued for distinct ethical debates as hESC research and IVF treatment pursue different goals. Central to its reflections – richly contextualized within the scientific and legal assessment of stem cell research that NACBE borrowed from TA-Swiss – were three ethical models and the affordances they make for dealing with the supernumerary embryo. This provided the foundation for a theoretical analysis of ethical principles at stake. It also constituted the basis for NACBE's deliberation as a *committee* which pronounced a set of recommendations. It reiterated its earlier assertion that the protection worthiness of the early embryo can only be assessed through open and transparent democratic decision-making. Legal options for enabling hESC research in Switzerland, NACBE maintained, would be i) the derivation of hESC from already existing and cryoconserved or future supernumerary embryos, ii) research on imported hESC, or iii) alternative derivation methods such as parthenogenesis. A majority of NACBE's members further recommended that supernumerary embryos up to the blastocyst state should be used for hESC derivation, provided that the embryo in question is genuinely supernumerary (created for IVF and *not* research; informed consent of the parents *after* the possibility of reproductive use has become medically impossible) and that the scientific research is of excellent quality and cannot be conducted with alternative methods. Furthermore, no patents should be awarded on organs, cells or cell lines and commercialization of embryos or directly derived cells should be banned. Finally, a clinical research ethics panel should verify a research project's compliance with these conditions. A majority also recommended allowing hESC importation, although not of embryos or egg cells, provided they are derived fol-

liament and no longer exerts processual control over an issue.

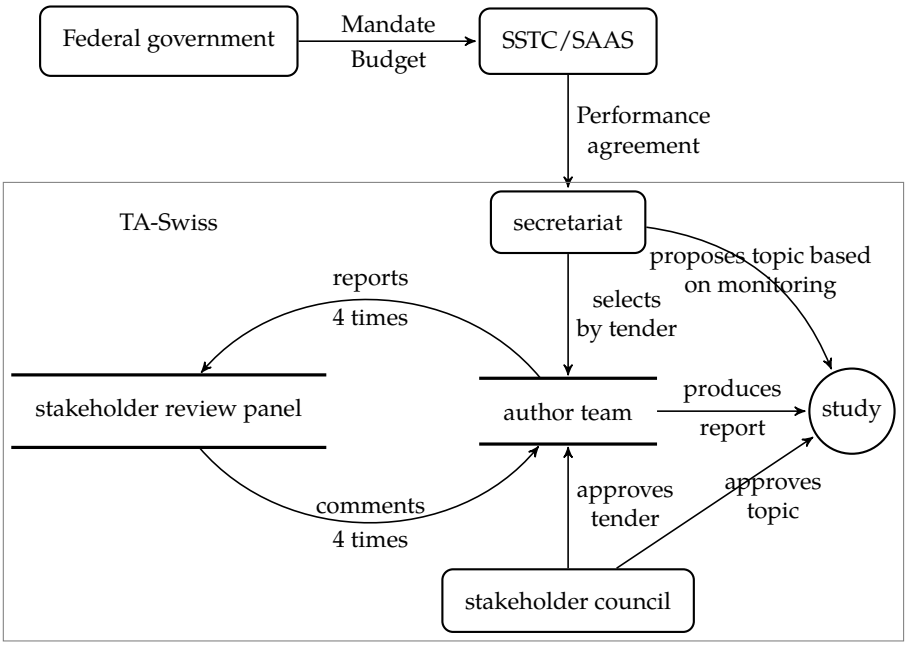

Figure 6.2: Organization of TA-Swiss. *Source:* author's illustration.

lowing the same ethical standards applicable in Switzerland. A 'cut-off date' rule – which was introduced in Germany and the USA at the time – was unanimously rejected. With regards to alternative methods of hESC derivation, the commission recommended holding off any regulation before more was known about their scientific potential.

TA-Swiss

Unlike NACBE, whose first official act consisted in cautioning SNSF not to preempt public deliberation on human embryonic stem cell research by taking a decision about the Krause/Jaconi research proposal, the center for technology assessment (TA-Swiss) had been closely watching the emerging field of hESC research since Thomson's first successful derivation of a cell line in 1998 (cf. Thomson et al., 1998). By November 2000, TA-Swiss decided that the issue had gained sufficient societal and political relevance to warrant an investigation into the state of the art, the medical and economic potential, and the legal and ethical implications.[31]

[31]It appears that TA-Swiss was not aware of the Jaconi/Krause research proposal submitted to SNSF when it prepared the outline of its own inquiry. Internal documentation (Nov. 2000) only lists Swiss research projects employing fetal or adult stem cells.

TA-Swiss is unlike any other advisory body in Switzerland.[32] As Figure 6.2 illustrates, it is more of an organizational infrastructure than a committee for advice production. That infrastructure consists of a small staff (the secretariat),[33] which monitors scientific and technological developments with social and political implications and identifies potential topics for study. It recruits study authors by tender, and assembles a stakeholder review panel that is deeply involved in monitoring the study process. For the stem cell research assessment, a mixed German and Swiss consortium of scientists around biologist Bärbel Hüsing[34] won this tender.

The role TA-Swiss played in the stem cell controversy, as well as its more generic organizational principles and procedures, suggest that the organization's commitments in the political arena may be likened to the goals pursued by a boundary organization (cf. Guston, 1999, 2000, 2001). TA-Swiss sees itself as an advisory body, whose job is not to score on *impact* but to sensitize people. "One has to be careful not to make prescriptions for Parliament", contends Interviewee VIII. Yet despite this discourse of 'non-impact-seeking', internal documentation shows that TA-Swiss keeps a close account of its interventions and mentions in politics and the public sphere. Rather than a stakeholder in a more or less well delimited policy subsystem – which could be said of NACBE – TA-Swiss is the product of the political system's coping with 'reflexive modernization' (Beck, 1992).[35] Not only do its studies address a wide range of emerging technologies, touching upon multiple policy domains, the organization also lacks unconditional support within the scientific community. In fact, it must carefully balance its position in order to avoid either

[32]TA-Swiss is formally independent and executes the legal mandate of technology assessment specified in the Federal Act on Research under a performance agreement between the State Secretariat for Education and Research (SER) and its parent body. Until 2008, this parent body consisted in the Swiss Science and Technology Council, an extra-parliamentary commission advising the Federal Council on science policy. However, with the establishment of the Swiss Academies of Arts and Sciences, the federal government decided that this body serves as a more suitable parent (Interviews V and VIII).

[33]The secretariat operates under the supervision of a permanent stakeholder council, which meets four times per year. It approves the study topics and the author recruitment process. TA-Swiss also organizes participatory technology assessment events – the *publiforum* and its smaller-scale sibling the *publifocus* – inspired by the consensus conference model developed in Denmark (Interview VIII, see also Bellucci 2006).

[34]Previously, Hüsing and some of her co-authors on the stem cell study had been awarded a TA-Swiss tender for a study on cellular xenotransplantation, which was published in 2001.

[35]Concerns about nuclear energy (Chernobyl) and a chemical accident (Schweizerhalle) form the backdrop of parliamentary engagement for the establishment of technology assessment in Switzerland.

being stamped by scientific and industrial interests as an 'obstructor of technological progress', or, conversely, as the scientific community's 'mouthpiece' (Interview VIII). On that backdrop of institutional vulnerability it is comprehensible that TA-Swiss jealously guards its organizational independence (Interviews V and VIII).

Because its presence in any policy field is transient, TA-Swiss lacks strong ties to institutional political actors. This introduces a reliance on institutional state–society interfaces such as the consultation procedure for communicating with decision-makers. It is hoped that timing a study for publication during the consultation procedure ensures that it is taken up within the governmental dispatch (Interview VIII). As governmental agenda setting is hard to predict, this is notoriously difficult and also futile to some degree, for – as Interviewees V and VI contend – a real possibility of influence has mostly expired by that moment. Like NACBE (and probably any well-organized interest group), TA-Swiss also organizes events while Parliament is in session, distributes study summaries, and makes study authors available for parliamentary hearings. This script also applied to the stem cell study, although the rapidly advancing political schedule required much agility given that work on the study only began in August 2001.[36] In an exceptional move, TA-Swiss decided to release an intermediary report on April 10, 2002 (Hüsing et al., 2002). The final publication followed on February 3, 2003 (Hüsing et al., 2003). In terms of TA-Swiss' position, the two versions do not differ significantly. The following discussion is based on the intermediary version, for it was politically more relevant in terms of its timing.

TA-Swiss' elaborate procedure, deployed for securing the 'political and epistemic robustness' (Weingart and Lentsch, 2008) of its studies, is an entirely different endeavor and takes full advantage of the policy elite's networks. Devices such as the permanent stakeholder steering committee and the study-specific stakeholder panel are meant to ensure impartiality, while an external study team denotes expertise. TA-Swiss selects members of the stakeholder review panel through informal consultations following a logic of interest representation and diversity of view-

[36]Soon after the study project was set up, external events begun disturbing its schedule and forced a sustained acceleration of the project. These events include the SNSF funding decision (Sep. 2001), followed by the Federal Council's announcement to draft a bill (Nov. 2001), and – after only six months – the opening of the governmental consultation procedure on May 22, 2002.

points. Besides industry and NGO representatives, medical practitioners and patient groups, researchers and other representatives from the scientific community, TA-Swiss also attempts to include MPs, especially those that have submitted petitions in the matter. The inclusion of civil servants and members of other advisory panels is also important, since it enables direct communication and coordination of activities in different organizations.[37] Thus, the aim is to constitute the panel as broadly as possible, but only to invite people who are willing to participate in a dialogue (Interview VIII).

The study authors meet with the stakeholder panel on four occasions. Firstly, in order to present their proposal and to provide an opportunity for the panel to validate or criticize the framing of the study's premises and questions. The initial meeting is followed by the presentation of two intermediary reports, with the first being centered on the technology itself while the second addresses the legal and ethical implications. During a last encounter, the entire study and its recommendations are discussed in detail, including the wording of contentious passages. It is then the stakeholder panel who issues the recommendation for publication to the steering committee. These meetings are private and, as Interviewee VIII recalls, no media indiscretions have been known so far, despite at times controversial (yet constructive) discussions.

The stem cell assessment was also split into three sub-projects, the first presenting the medical and scientific foundations (Beatrix Rubin), the second elaborating the ethical aspects of human stem cell derivation and utilization (Eve-Marie Engels), and the third clarifying the legal framework (Rainer J. Schweizer)[38]. The report Hüsing's team presented may be summarized by the recommendation 'rather not, but if you must…'. This scientific and legal assessment also became the foundation of NACBE's work (cf. Nationale Ethikkommission im Bereich Humanmedizin, 2002), as well as of a brochure produced by *Science et Cité*. The study's economic

[37]The 10 member stakeholder panel convened for the study was presided by Margrit Leuthold, then secretary general of the Swiss Academy of Medical Sciences (SAMS). Its members were drawn from academic ethics, clinical research, the health insurance and pharmaceutical industry, a GMO-critical NGO, TA-Swiss' own steering committee, its parent body SSTC, and FOPH. The latter was represented by Verena Schwander, later to be project leader on the stem cell research legislative project. The complete member list is available in Hüsing et al. (2003: 325).

[38]Prof. Schweizer's engagement for TA-Swiss and for FOPH were entirely separate. The legal assessment, however, was identical in substance.

assessment can be reduced to the acknowledgement that human embryonic stem cell research was too young to be the subject of commercialization.

The report's ethical assessment, by Eve-Marie Engels, ethics professor at the University of Tübingen in Germany is, however, significant. Like NACBE, she employed a range of conceivable moral statuses of the embryo (i.e. object vs. person with intermediary gradations) as heuristic device. But she took a rather different stance on 'supernumerarity'. If anything, she argued, supernumerarity is an artificial condition, and thus does not serve as an ethical argument, at least not under scenarios regarding the embryo as closer to a person than a thing. Her conclusions are a clear vote against the derivation of stem cells, even from supernumerary embryos. She advances biological (tumor generation) and also societal (slippery slope) arguments against the use of hESC for research in the first place and contends that there are alternatives in the form of adult stem cells. Moreover, she distinguishes between simply destroying an embryo and using it for research, due to instrumentalization. It is this ethical appraisal that strongly informs the report's overall conclusion. The study authors clearly caution against hESC research, which should only be authorized – either through a special law or the importation option – if it is felt that hESC research is of great importance for Switzerland at this point. Instead, adult stem cells should be favored at this time. However, should legislation be adopted, it should contain a series of conditions under which importation or domestic derivation of hESC would be admissible.[39]

Political parties, a missing actor?

The major Swiss political parties constitute the final set of actors whose commitment and role in the stem cell controversy I discuss here. To begin with, Swiss political parties are internally rather heterogeneous, especially in their vertical fragmentation across different levels of government (cf. Kriesi and Trechsel, 2008: Chap. 6). Yet beyond this more systemic aspect of intra-partisan heterogeneity, the extent to which any of them acted as a coordinated and coherent actor in the stem cell case is disputable.

[39]SNSF, NACBE, as well as the Swiss Academy of Medical Science's ethics panel all formulated very similar conditions.

The Green Party was the first to embrace the issue when, after a meeting of its parliamentary group on September 8, 2001, it submitted a comprehensive list of (suggested) questions in the National Council, to be answered by the Federal Council (Sep. 18, 2001; Curia Vista 01.3436. See also Hofmann 2001a). They concerned the presumed lack of a legal framework for destructive embryo and hESC research, the need for a public debate, the potential of adult stem cells, and the suggestion of a temporary ban on hESC importation. At the same time, the questions' phrasing suggests that they were not aimed at seeking information, but as a device to seek confirmation for an established point of view. One such question reads:

> "Does [the Federal Council] share the opinion that the meaning and intention of [Const. art. 119.2c] prohibit the utilization of human embryos for destructive research and that the importation of embryonic stem cells, too, contradicts the meaning and intention of our Constitution?" (Curia Vista 01.3436; my translation).

Later, it was also the Green Party that demanded the resignation of SNSF research council president Heidi Diggelmann (Hofmann, 2001b). The Radical Party, albeit with a delay of a few months, also devoted attention to the issue. It organized a symposium on biotechnology in February, 2002, featuring Karl-Heinz Krause as one of the invited scientists (Hofmann, 2002b). Early during the public consultation procedure, the party also released a position paper articulating its clear commitment to the cause, citing economic motives (Hofmann, 2002a). Other parties, however, lacked a coherent commitment. The Christian Democratic Party's Rosemarie Dormann may have been the first politician to articulate the issue through her parliamentary initiative[40] (Curia Vista 01.441; Interview X; Hofmann 2001a), but the issue could not really gain traction with the wider party, notably because of its perceived moral divisive nature and complexity (Interviews X and XI). To some extent Dormann would remain a lonely warrior for her party in publicly defending a critical stance. Other party members only came to dedicate attention to the

[40]Her initiative called for a moratorium of destructive embryo research until the completion of FARHB, while allowing hESC research on condition that they originate from already existing cell lines abroad, that research pursues a clearly defined objective not attainable with alternative means, and that the aim of the research would be the medium to long term use of *adult* stem cells. In the justification of the initiative, she argued that both the constitution and FAMAR contain provisions banning destructive embryo research. Moreover, hinting at SNSF, she condemned "that extra-parliamentary and non-political authorities foreclose decisions and possibly create prejudice concerning such a sensitive field of research…" (Curia Vista 01.441; my translation.) The initiative was rejected.

issue through their institutional mandates as MPs. The only collective preparation Interviewee XI recalls was the organization of a Christian Democrat parliamentary group hearing inviting a professor of theology to elaborate on the issue. Although not filing any petitions in Parliament at that early stage, the Social Democratic Party established a special committee, with an expert hearing scheduled for early October, 2001 (Hofmann, 2001a), to which, according to Interview VI, researcher Marisa Jaconi was invited.[41] But the party was also divided, which ultimately left individuals to fight for their cause. Finally, the Swiss People's Party lacked any discernible coherent public profile on the issue. Many of its MPs signed two completely contradictory parliamentary motions, one in favor and one against human embryonic stem cell research (Gerny, 2002).

Thus, in most political parties the portfolio was in the hands of a few specialists who made the investment of acquiring the expertise necessary for fully comprehending the issue. This investment proved all the more important the less contact a person had through his or her education and professional background with scientific research and biomedical policy issues (Interviews IX–XII). This was also true for Parliament, where only a small number of representatives in each political group led the debate (Interviews IX and X). Little could be comprehended of the complex matter from the purely lay perspective of the average MP, Interviewees IX, X and XII judge. This assertion is well captured by MP Hermann Bürgi, who also deliberated the legislative proposal in the science committee. During the Council of States' floor debate, he explicitly drew attention to this complexity.

> "As a preliminary remark, I would like to ascertain that the to-be-regulated issue constitutes a real challenge for the legislator. To begin with, one is confronted with very demanding natural scientific background knowledge, maybe too demanding for a layperson without such the relevant background. [...] In addition to this, we have a very complex legal situation, combined with fundamental ethical questions." (AB *2003* S 167, my translation)

This complexity seems to be characteristic of regulatory issues pertaining to scientific research, a legislative domain that Interviewee V judges to be particularly challenging for MPs. Interviewee X "[...] was under the impression that the limits

[41] I could not confirm whether the two sources describe the same event.

of the semi-professional Parliament were not breached in any domain but scientific research" (my translation). Interviewees X and XII report their experience as being that, unlike political domains such as social policy, MPs simply lacked personal experience to draw from.

Evidence suggests that the political parties and its MPs drew largely on their own networks for expertise and that no consultation of what could be approximated to disinterested expertise took place. Moreover, this discussion also reveals the inadequacy of such information resources when it comes to complex questions like stem cell research.

6.4 Sites of contestation

So far I have characterized the exogenous elements that constituted the action situation of interest, as well as a number of actor perspectives that in some way dealt with decision-making and scientific expertise. The case study now turns to the examination of three institutionally structured sites where some of these actors came to interact, either through meetings or through the proxy of written statements and the media.

Consultation procedure

The first of these sites is the consultation procedure which the Federal Council scheduled to take place between May, 22, 2002, and August 30, 2002. During such a procedure, the Federal Council actively solicits feedback from a list of actors it deems concerned by an issue. In principle, 'uninvited' feedback may also be submitted. Consultation on the stem cell proposal deviated from the normal routine in that the Federal Council sponsored a campaign to breach the boundary of the policy subsystem and to make stem cell research a topic of debate among the wider public. It is at this point that it drew on *Science et Cité*, the public engagement foundation presented earlier. Its task was to organize a public campaign that begun with the consultation procedure and ended when the Federal Council transmitted the dispatch to Parliament. Chairing the campaign was a stakeholder committee composed of proponents and opponents, like those deployed in TA-Swiss' study

process, but with organizations as members (e.g. SNSF, the Academies, etc.). The campaign consisted of a widely distributed information brochure detailing the different aspects of the issue (cf. Brauchbar Büchel Partner AG et al., 2002)[42] and a series of panel discussions featuring researchers, politicians, ethicists and legal scholars. Other organizations sponsored also similar debates. TA-Swiss, for instance, conducted a scaled-down version (due to time constraints) of its citizen deliberation forum, where several demographic groups discussed stem cell research in a professionally moderated discussion (Rey, 2002).

There was media coverage of the public engagement process itself (e.g. Brauchbar, 2002; Hofmann, 2002c,d). Moreover, part of this rather academic legal and ethical debate also took place within the media, where positions were articulated and attacked. For instance, Rainer Schweizer (2002b) summarized his legal commentary in a newspaper article and several other articles featured guest commentaries by ethicists (e.g. Baumann-Hölzle, 2002; Fischer, 2002; Rehmann-Sutter, 2002; Seelmann, 2002). It was through this forum that a key difference between NACBE's majority position and the ethical position defended in the TA-Swiss report – both published just before the advent of the consultation procedure – became apparent. The TA-Swiss report maintained that an embryo, beginning with fertilization, has the biological potential to become a human being and may therefore not be instrumentalized for research. This would also apply to the supernumerary embryo, as its condition is of legal and not of biological nature. The counterargument rejected that position, with the contention that ethical qualifications cannot simply follow from biological observation, but represent human judgement. It was further argued that biocentric argumentation is especially misplaced in the context of IVF treatment, where technology has come to play an important role in a hitherto natural process.

The articulation of these two fundamental positions afforded opponents (some Christian Democrats, Social Democrats, the Green Party, pro-life groups) with an argumentative anchor. Citing the TA-Swiss report (Hüsing et al., 2002) and the legal interpretation therein, they argued that the legislative proposal was unconstitutional, because the legislature was 'silent' on the matter of hESC when it voted

[42]The brochure was produced in collaboration with TA-Swiss and sent to the official addressees of the consultation, all MPs, and many thousand members of the general public.

Const. art. 119 in 1992 and FAMAR in 1998 (cf. Eidgenössisches Departement des Innern, 2002: 5). It may appear rather paradoxical at this point that the evidence (but not conclusions) provided by a single legal expert – Rainer J. Schweizer – were used by the administration to solidify the claim of constitutional validity of the proposal while it also provided the essential argument to the opponents.

There were further critical arguments, some of which also resonate with the TA-Swiss report, though without clear reference to it. They included the abovementioned anti instrumentalization argument, backed up by the constitutional provision of human dignity; the slippery slope argument, which warned that human cloning might one day be called for as a result of providing for stem cell research; and the lack of sufficient proof for the necessity of hESC research ('adult stem cells are an alternative') (Schweizerischer Bundesrat, 2002: 1226). Further points of criticism, also shared by proponents, included the lack of a provision on patenting, the call for limiting *in vitro* development to 7 instead of 14 days, and the use of 'human dignity' as term to denote the limited protection worthyness of the supernumerary embryo (Schweizerischer Bundesrat, 2002: 1229).[43] Nonetheless, the proposal was positively received and did not engender any modifications. However, the dispatch addressed every single point of contention in detail and provided a justification why it was preferable to stay with the original version of the bill.

When comparing the consultation procedure with the subsequent parliamentary debate, three things become apparent. Firstly, arguments developed during the former were exactly reiterated in the latter. Some of these arguments (e.g. adult stem cells as a viable alternative to hESC) even originate in the very beginning of the discussion in summer of 2001. But compared to its first articulation, the consultation procedure had sharpened the 'hESC research is unconstitutional' argument by refocusing it on human dignity. Secondly, when comparing the list of people who submitted comments to government or wrote a press commentary with the list of hearing participants during parliamentary committee deliberation, the latter is almost entirely represented in the former. Finally, commentators have noted that

[43]The government justified the absence of a patenting provision with the ongoing reform of the patent code. The rationale for 14 days was given as compatibility with international standard. The human dignity argument is a legal coherence argument, for the called-for term 'dignity of human life' was absent from Swiss law at the time, but used in European law.

the process of engaging the public about stem cells fell short of the organizers' expectations (e.g. Brauchbar, 2002). These efforts were also not used as arguments during the parliamentary debate. But they seem to have provided a forum in which experts from research, law, and ethics articulated lines of argument clear enough to be associated to a pro or a contra position in parliamentary committee debate.

Deliberation in Parliament

Parliamentary deliberation of the legislative proposal constitutes the second site of interaction. More precisely, deliberation in the parliamentary committees on science, education, and culture (CSEC in short) of both houses that encompassed the majority of interaction. Deliberation of the draft *Embryo Research Act* commenced in January 2003 and was scheduled to be accomplished by year's end. The schedule was tight because the incumbent legislature was due to expire in December, which also coincided with FAMAR's ultimatum to destroy pre-FAMAR embryos. The Council of States first discussed business in a committee,[44] before bringing it to a floor vote on March 12, 2003. The National Council's committee took up the job thereafter and the floor debate took place on September 17, 2003. It was referred once more to the Council of States (December 4) for elimination of differences before both houses adopted it in a final vote on December 19, 2003.

Resources of expertise

Subcommittee deliberation usually commences with hearings, followed by an open debate and ending in a discussion of individual provisions, given that the committee agrees to consider the governmental proposition in the first place. It was the organization of hearings and – unusually – the presence of Prof. Schweizer during most of committee deliberation in both houses that provided a venue for the mobilization of and argumentation with positions articulated by the previously discussed members of the 'hESC advisory regime'.

The hearings were unusual in two regards. First, with one exception, only researchers and academics were invited. Interviewee XII has observed such an exclu-

[44] CSEC-CS met on January 20/21, February 17/18, and for elimination of differences on November 18, 2003. CSEC-NC meetings were held on April 10/11, May 15, and August 21, 2003.

sively academic hearing occurred only in science policy issues such as genetic engineering and human subject research legislation. Second, the committees of both houses held equally intense hearings, giving voice to stem cell researchers, legal scholars, and ethicists.[45] Interviewee XI reports that by the time a proposal has been debated in the first house, hearings either do not take place at all (because there are meeting minutes of the original hearings), or on a limited scale if open questions remain. However, each committee spent half a day hearing the presentations of six (different) guests and asking them (the same) questions.[46] Despite this exceptionalism, these hearings conformed to a generic routine: for each person in favor of hESC research, there was another who opposed it (Interviews IX-XII).[47] Moreover, the identification of hearing participants also followed established practice. Some committee members made suggestions and the committee president solicited FOPH's input (Interview IV).[48]

Prof. Schweizer initially testified during the CSEC-CS hearing, but also remained present and actively engaged during the actual committee deliberation of the same committee. Further, despite of not having been invited to the CSEC-NC hearings, his presence was later solicited as the committee started deliberation of the actual proposal. All interviewees (IV, VII, X, XI and XII) who had first-hand knowledge

[45]Hearing participants included stem cell researcher Marisa Jaconi (co-author of the infamous funding proposal), professor of anatomy Günther Rager, legal scholars Rainer Schweizer and Dominique Sprumont, and NACBE members Ruth Baumann-Hölze and Alex Mauron. Testifying in CSEC-NC were legal scholar Kurt Seelmann, stem cell researchers Catherine Nissen-Druey and Yann Barandon, TA-Swiss study lead author Bärbel Hüsing, NACBE president Christoph Rehmann-Sutter, and NGO representative Martina Meier (NOGERETE). As Interviewee II explains, invitations were *ad personam*. Thus, even though members of NACBE or authors of the TA-Swiss study testified, they were invited because of their personal position and not specifically due to their institutional affiliations. Seelmann and Rager were also members of the Swiss catholic church's bioethics working group (Arbeitsgruppe Bioethik der Schweizer Bischoftskonferenz, 2003).

[46]Most hearing participants also submitted a written testimony.

[47]Interviewee IX describes disagreement among hearing participants as "the alpha and omega" of a good hearing and it is casting the hearing participant recruitment net wide that affords this configuration. It facilitates the articulation of ones own position, especially in an unknown field (Interviews X and XII), for which stem cells are a rather good example. Moreover, as Interivewee XII elaborates, triangulation between different opinions is important because hearing testimonies necessarily contain blind spots induced by individual world views and legitimate interests, of which also scientific experts are not free of.

[48]A comparison of names appearing in the governmental report about the consultation procedure and the persons invited to speak in the hearings reveals a very strong overlap. In nine out of 12 cases, either the parent organization of an invited speaker or the person herself commented on the governmental proposal (Eidgenössisches Departement des Innern, 2002). Moreover, several invited speakers publicly communicated their points of views around the time of the governmental consultation procedure in guest articles appearing in the daily *NZZ* (Baumann-Hölzle, 2002; Rehmann-Sutter, 2002; Seelmann, 2002).

of the committee deliberation process describe this as highly unusual. The role enacted by Schweizer closely resembles one usually assumed by a high-level civil servant either from the Federal Department of Justice or the legal division of the department in charge, an analytic observation shared by Interviewee VII based on personal experience.

In addition to the expertise resources mobilized during committee deliberation, it is noteworthy that NACBE organized a public information event addressed at Parliament just prior to the beginning of these deliberations. TA-Swiss organized a similar event, after the first committee finished deliberation, but before it moved to the floor of the Council of States. This timing correlates with the observation that while NACBE's position was discussed throughout the CSEC-CS deliberation, no mentions of TA-Swiss occured therein.

Mobilization and consequences of expertise

In parliamentary deliberation, face to face interaction with invited guests only takes place in the committee's private realm. This applies to the present case, although references to expert testimony were also carried into the public floor debate of both houses. An analysis of the interaction between the invited hearing participants and committee members reveals that – despite the extraordinary intensity and the academics present – most discussed issues consisted in a reiteration of positions already publicly known since the consultation procedure. As a MP fittingly remarked during committee deliberation, there was nothing new to be learned from them.[49] But this does not discount the potential importance of redundancy in persuasion.

In the first committee (CSEC-CS), Prof. Schweizer and another legal scholar reiterated the already known constitutional interpretation. They were followed by Prof. Jaconi, who detailed her study on hESC and argued for the need to conduct comparative research with adult as well as human and animal embryonic stem cells in order to learn more about cell differentiation mechanisms. A professor of anatomy and a professor of biomedical ethics argued whether it is admissible to derive ethical conclusions from biological developments. The deployed arguments were not new

[49] I am not in a position to reveal the names of the MPs whose positions I described due to meeting minute confidentiality. However, I breach this confidentiality in a case a person defended the same argument also in a public context.

and had been amply discussed during the consultation procedure. Finally, another ethicist delivered a warning against the slippery slope towards cloning, should hESC derivation from supernumerary embryos be allowed. In the second committee (CSEC-NC), a different cast of hearing participants repeated the same arguments. This time, however, it was a professor of philosophy of law who used a bio-ontological argument to justify his assertion that the constitutionally protected human dignity fully covers the supernumerary embryo. The second hearing was also more contentious as different MPs actively engaged in argument by asking rhetorical questions (e.g. "wouldn't you agree that…?") and, in one instance, openly challenging a participant's scientific credentials. While Interviewee XII experienced these hearings as 'pivotal', the meeting minutes of the ensuing debate is almost devoid of references to or arguments drawn from these presentations. Nevertheless, some hearing participants left (positive and negative) impressions that a number of Interviewees vividly recall (e.g. IV, X and XI).

But there were also pre-articulated elements that – through reiteration – helped to shape some consequential decisions. The NACBE (prior to deliberation) and Prof. Schweizer (during committee meetings) criticized the governmental proposal in several regards. They argued, for ethical or constitutional reasons, that the proposal should be narrowed to only allowing for domestic hESC derivation (instead of generic embryo research), for the purpose of a concrete research project only, limiting the cultivation of an *in vitro* embryo to 7 rather than 14 days.[50] These points of criticism, delivered by NACBE in a policy brief and in Schweizer's hearing presentation, were taken up by a group of CSEC-CS members who – during deliberations in the presence of Schweizer – came up with exactly the same proposals, also supported by other CSEC-CS colleagues. This reshaped the proposal, which was duly renamed from *Embryo Research Act* to *Stem Cell Research Act*. Moreover, these MPs – all with advanced law degrees – suggested that a motion, separate from the stem cell bill, should be voted mandating the government with the elaboration of an explicit constitutional foundation for human subject research. Schweizer expressed

[50] FOPH suggested the 14 days deadline in conformity with similar rulings in other countries; yet the Swiss Constitution bans the development of embryos outside the womb. The problem is that embryos for hESC harvesting have to be developed a few days longer beyond the duration at which they would normally be destroyed if declared supernumerary. The 7 days rule was thus a compromise.

support for this idea. As a result of this committee motion, which was accepted in both houses, such a provision exists today.

The issue of patenting reveals the similar, if not even more important, role of Prof. Schweizer. Ever since the consultation procedure, the governmental proposal had been criticized for the lack of addressing the patenting of stem cells. It was through Schweizer and NACBE that this concern was carried into CSEC-CS. The administration's own Institute for Intellectual Property (IIP) did not express sympathy for banning patents on stem cell lines and was even less inclined to see such a provision in the stem cell research act rather than in the soon-to-be overhauled patent code. Committee members close to economic interests were eager to hear IIP's testimony and a representative was heard, but after the other hearings. The invited IIP representative attacked NACBE's stance on patenting as 'undifferentiated' and 'unhelpful'. Schweizer in turn scolded IIP for playing an inadmissible delay strategy in the patent code reform process. Ultimately, FOPH's director asked Schweizer to elaborate a legislative proposal, to be discussed during the next meeting. This suggestion was then integrated into the proposal and survived political challenge to become part of the law. Although counterfactuals are notoriously problematic when it comes to the influence of expert arguments, it is fair to say that a MP would have lacked the resources to challenge government's stance on patenting the way Schweizer did. Interviewee XII, having earned a doctorate in law, elaborates that s/he experienced intellectual property law as quite inaccessible without appropriate specialization.

Finally, where CSEC-CS, by proposing a future constitutional amendment, settled the remaining doubts as to how to interpret the Constitution's silence regarding research on supernumerary embryos, such closure was not readily achieved in CSEC-NC. Opponents of stem cell research who, since the beginning of the controversy, argued that any legislation in the matter would be unconstitutional, continued to argue so. Pascal Couchepin, the Federal Councillor who had taken over the portfolio after Dreifuss' retirement, was somewhat surprised at this challenge, arguing that Schweizer had proven constitutional compliance. Already during deliberation in CSEC-CS did Couchepin ask Schweizer to present the constitutional argument, rather having a representative of the administration argue the point. The

need for Schweizer's interpretive authority of constitutional matters lead to an odd moment during deliberation in CSEC-NC. Because Schweizer had not been invited, a top-level civil servant, who declared him/herself to be a personal acquaintance of his, saw him/herself forced to speak in Schweizer's name and vouch for his utmost diligent prudence in arriving at his conclusion. For the following meetings, Schweizer was invited back. But his presence did not appease critics. Some continued to argue that the constitutional foundation was not given, as if Schweizer had not have delivered his unwavering interpretation just an instant ago. They did not attack him; they even asked for suggestions of how to legally formulate their counterproposals (which he dutifully gave). They simply pretended he had never said anything on the matter. The following quote from the National Council's floor debate exemplifies this and takes it even further by enrolling Schweizer's credibility for its own purpose.

> Rosemarie Dormann: "... In an expert opinion commissioned by the Federal Council, the very same Professor Rainer J. Schweizer, who also drafted the legal opinion for TA-Swiss, arrives at no conclusive answer. This is not surprising in the light of this expert's respectability known to all of us." (AB *2003* N 1351, my translation.)

This analysis shows that a constitutional expert with a solid reputation may be in a position to significantly shape Parliament's response to a governmental legislative proposal. At the same time, it also shows that there are virtually no boundaries to interpretative flexibility.

The referendum

A final site of interaction opened when an *ad hoc* committee of techno-critical and pro-life movements (cf. Hofmann, 2003b) collected enough signatures to force a ballot vote, executed on November 28, 2004. A solid two-thirds majority of voters backed Parliament's version of the bill.

Although the referendum turnover was on the low side with just 37 percent, there was a marked difference to the sites of contestation that preceded the final vote in Parliament. The issue was now in the hands of clear advocacy committees, which appealed to their constituencies. While scientists were engaged in the support campaign, presenting their work and motivation to anyone interested (Interview I), the

previously engaged academic experts almost disappeared from the media reporting leading up to the campaign. The professional discourses of ethics and law made space for more overt ideological and religious views. This does not mean that scientific and legal arguments disappeared entirely, but they were no longer pronounced by members of the 'advisory regime'. For instance, it was the federal administration which addressed the issue of constitutional compatibility in a newspaper article (cf. Schwander, 2004a).

6.5 Discussion

This case study of the making of the stem cell research act and the role of academic expertise within this has thus far accomplished three things: Firstly, it identified the science of stem cell research, path dependencies from previous biotechnological controversies, and the international political response to stem cell research as three exogenous but strongly structuring factors of the overall action situation. Secondly, it has shed light on the commitments of the most important actors to mobilize expertise and elaborated the production of that expertise. Thirdly, it has detailed three institutionally structured venues of negotiation and contestation and provided an analysis of how expertise was mobilized therein.

In this concluding section, I will reintroduce this thesis' central concerns and provide an interpretation of the case study through the theoretical lens outlined in chapter 3. For this purpose I start with the characterization of the overall action context, in order to determine in which sites experts and expertise have been mobilized. Next I consider the causes of expert mobilization, and examine to what extent they are products of the action situation. Finally, I look at the consequences of expertise mobilization and assess the conditions that enabled them.

Action context

From the inception of the controversy in summer 2001 to the referendum vote in late 2004, opponents (and, to a more moderate degree, proponents) of stem cell research deployed the same set of arguments. While these arguments primarily articulated values about the role of democracy in science and technology, as well as the

moral status of the embryo, they were also linked to factual statements from academic experts about the constitutionality of the proposed legislative initiative, as well as about the transdifferentiation potential of adult stem cells. However, these epistemic claims were contested. Opponents refused to settle the constitutionality question, despite repeated and consistent expert testimony. And while some uncertainty about the potential of adult stem cells was admitted, opponents and proponents drew very different conclusions. In short, the problem was unstructured, with co-constitutive disagreements about values and facts. These persistent disagreements concerning the values and knowledge at stake illustrate the unstructured nature of the issue.

However, this assessment requires some revision if we consider the government's own perception of the situation. Government strategy was to diffuse the value controversy by subjecting it to the institutional treatment of the policy process, rather than attempting to obtain a consensus through inclusion. Stakeholders had no access to policy formulation and critical questions – such as the potentiality of different kinds of stem cells – were delegated to policy implementation. The government therefore treated the issue more as a semi-structured issue with disagreement about values than an outrightly unstructured issue. Moreover, speaking in retrospect, Interviewees IV and VI draw attention to the highly symbolic nature of the controversy. Very few distributional consequences were attached to the bill, which was to regulate a dozen research projects only. Rather, they suggest, it was an instance of the wider struggle between morality and freedom of research. In comparison to Germany, however, Interviewee II judges the Swiss debate to have been rather tame.

Each procedural step received consistent media coverage. *Le temps* and the *Neue Zürcher Zeitung* provided ample coverage and analysis of the latest discoveries made in connection with stem cell research, as well as the procedural steps the Swiss legislative response was taking. All public statements by NACBE and TA-Swiss received coverage, as did the public engagement campaign sponsored by the government. This led to the high visibility of expert arguments during the consultation procedure. Due to the referendum campaign, media coverage did not falter even after Parliament had adopted the law. However, coverage then became significantly

less focused on expert argumentation, instead privileging the more ideological register of justification advanced by proponents and opponents of the bill.

Causes of expertise mobilization

This case study revealed the participation of two kinds of experts: mandated academics (Profs. Guillod and Schweizer), and advisory councils (NACBE and TA-Swiss). In order to explain the solicitation of Schweizer's expertise, it is necessary to distinguish between four different sites in which his expertise was deployed. The first consists of the FOPH report; the second is the mandate for TA-Swiss; the third is Schweizer's engagement in the public debate under his own initiative (personal communication, July 3, 2012); and finally there is his extensive involvement in the deliberation of parliamentary committees.

Let's begin the examination with the FOPH report. The previous discussion has already established that – while being confronted with the need for a constitutional interpretation – Schweizer's opinion was sought as an insurance in the face of clearly anticipated and plausible adversity to FOPH's emerging commitment to close down the controversy by seeking legitimacy for stem cell research through lawmaking, thus allowing for some contestation within institutionally demarcated sites. But there are additional elements that enabled such a decision. There was Schweizer's constitutional commentary, which authenticated him as the most authoritative legal scholar on the issue, as well as his agreement to elaborating a commentary on very short notice within an extremely tight deadline. Moreover, it was the absence of an institution – a constitutional court – that afforded Schweizer's profession with special prerogatives. Hence, several structural conditions as well as Schweizer's cooperation were necessary to enable FOPH's decision to solicit such legal expertise.

Schweizer drafted the legal opinion for the TA-Swiss report because he was part of a consortium that won a tender bid[51] prior to the eruption of the controversy; there is therefore no direct connection to FOPH's hiring motive. However, the other conditions couldn't have applied to the FOPH context without applying to TA-Swiss as well, given that this does not exist in a parallel world with an army of reputable

[51] According to Interview VIII, Schweizer's reputation was one of the reasons this particular teams of authors won the tender bid.

constitutional scholars specialized in medical biotechnology readily available. As mentioned, Schweizer's public appearances, notably his two contributions to the *Neue Zürcher Zeitung* (Schweizer, 2002b, 2003), were self-motivated. However, by that time he had already dedicated considerable time and energy to the production of the legal opinions. The newspaper articles disclose this affiliation, which will have further authorized him as an authoritative voice.

When considering Schweizer's substantial and highly unusual involvement in the parliamentary debate, there is no simple chain of causes that establishes previous engagements as the only causes. In light of standard hearing organization and the fact that Schweizer was the administration's expert, his participation in a hearing was probably inevitable. But he defended a partially divergent opinion from the administration's, taking a strong stance against it on the matter of patenting. However, his stance was not directly exploitable by opponents of the proposal. Yet the administration, with permission of the parliamentary committee, sought to keep him involved. There was certainly a substantial degree of self-motivation to remain involved (Interview VII), which may account for Schweizer's presence in the first committee. But there was also Schweizer's reputation among MPs, paired with the documented perception of complexity and lack of orientation (cf. quote Hermann Bürgi). In addition, Federal Councillor Couchepin was new to the portfolio. He consequently lacked the in-depth knowledge of his predecessor Dreifuss on the matter. This is a plausible reason why he repeatedly invited Schweizer to reiterate his assessment during committee deliberation. This became especially clear when some CSEC-NC members refused to settle the constitutional question. Thus, even if FOPH's decision to involve Schweizer was a deliberate decision in reaction to specific circumstances, multiple actors and specific institutional conditions were necessary to make Schweizer's engagement into the mediator role it became.

Let us now consider the two instances of the 'institutionalized mode' of expertise mobilization. The analysis of NACBE and TA-Swiss reveals an unambiguous institutional mandate to their actions which clearly preceded and was to continue beyond their involvement within the stem cell case. But how they went about their involvement with the stem cell controversy was the result of their own interpretation of their legal mandate. For instance, NACBE's internal working style and

repeated affirmation of its role as supporting rather than deciding was significantly shaped by its president[52] and contributed to the commitment to actively advise all institutional participants in the decision-making process. Both organizations operated from *outside* of government, aiming their advice at the same state-society interfaces – chiefly the consultation procedure and information events for Parliament – that interest groups would also target. But there is competition for the attention of MPs. NACBE, unlike TA-Swiss, had proven skillful at inserting its advice at the very beginning of deliberation, where many committee members lacked strong convictions. Parliament did not consult them as *organizations*, but heard individual members and their *personal* opinions instead. Both organizations somewhat compensated their outsider status through interpersonal networks (NACBE's secretariat located at FOPH and Verena Schwander of FOPH's membership in TA-Swiss' stakeholder council). While this kept them informed, it did not grant them access to policy design work.

While these traits are more generic to the institutional position of such advisory organizations, which is mediated by their self-projected identity, their work was significantly influenced by the rapid and somewhat unpredictable pace of the policy process. They had a game of constant catching up in order to remain relevant.

But relevant to what? That is where substantially different conceptions of science governance were expressed. Governmental policymakers construed TA-Swiss, NACBE, and the mandate of *Science et Cité* to make the issue public as a means of closing down the debate. Interviewee VI recalls having urged TA-Swiss to speed up in order to deliver arguments to appease the debate. The activities of *Science et Cité* were timed so as to expire when the proposal was submitted to Parliament. Indeed, some policymakers were irritated that NACBE continued its activities beyond that point. Inspired by the Danish consensus conference model (Interview VIII), TA-Swiss held a very different conception of technical democracy. The drive to really open up the debate was even more marked with NACBE. Thus, while the self-initiated activities of these advisory organizations followed a logic that was largely independent of the issue at hand, wider conceptions about technical democracy

[52]Based on their distinct experiences with extra-parliamentary commissions, Interviewees II and XXXIII report that it is mostly the commission president and a small minority of the members that does most of the work.

proper to science governance nonetheless came to inform advisory strategy.

Consequences of expertise mobilization

If we are to consider what consequences the mobilization of expertise engendered, we need to temporarily step back from social and institutional aspects to examine the cognitive arguments advanced. This perspective reveals the extent to which values and factual considerations were intermixed. Discounting Kurt Seelmann's public criticism of NACBE (Seelmann, 2002) and his indirect criticism of Schweizer during committee hearings, there was a single and coherent constitutional interpretation, originating from Schweizer's analysis. But this spread through different channels. On the one hand, it went from the TA-Swiss report to NACBE, which copied it from the former. From the TA report it also spread into the *Science et Cité* brochure. On the other, its language was integrated into the governmental policy proposal. This same coherence applies to the scientific assessment of stem cell research, as it originated in the TA study. Even stem cell researchers not involved in the study delivered accounts, in hearings, that were substantially congruent with it. This assessment also ended up in NACBE's report and the *Science et Cité* publication. But despite a coherent legal and scientific assessment, NACBE and the TA-Swiss report arrived at different conclusions and recommendations, with the former closer to FOPH's position than the latter. This difference can only be accounted for by the divergent ethical stances taken by NACBE's majority and by Hüsing and Engels, which came to dominate the TA-Swiss report.

Let us now consider three cognitive and discursive consequences of expertise mobilization. First, as I have demonstrated in some detail, the Federal Government used Schweizer's language to argue that a stem cell research bill would be constitutional in public articulations of its policy position, right up to the publication of the dispatch. However, the position itself is not connected to that assessment. Second, in connection to NACBE's discussion points for Parliament, Schweizer's criticism of the governmental proposal – including his material input to a patenting clause – inspired CSEC-CS members who had been concerned, but did not earlier express a strong opinion, to substantially alter the scope of the proposal. While there is a causal link between FOPH's mobilization and the first consequence, there

are many contingent links between the conditions that produced Schweizer's extraordinary presence in the parliamentary committee and its consequence. Third, while the fundamental arguments against stem cell research predate domestic expert pronouncements, and continued to resonate during the referendum campaign (where such expert voices were largely missing), critics were quick to pick up on the TA report's more cautionary message as clear evidence for their stance. Thus, expertise was enrolled into reasoning and argumentation in several different ways, owing to a very disparate array of causes.

There is also a broader observation about the overall discourse of the debate, which remained thoroughly 'professional' up to and including the final vote in Parliament. What I mean by this is that even value arguments were expressed in legal and biomedical ethical terms. For instance, the parliamentary committees did not hear religious leaders. Instead, a legal scholar and an anatomist were invited and expressed the traditional stance of the Catholic Church in, respectively, medical and legal terms. MPs also took pains to make a distinction between their general support for science and their disagreement on that particular issue. Nevertheless, they argued for the supposed advantages of researching adult stem cells. This expertise-laden discourse of legitimation was not evident during the referendum campaign. Its emergence cannot be directly attributed to the mobilization of domestic expertise. It is conceivable that the highly publicized consultation procedure provided a platform for the higher visibility of such expertise. Moreover, the MPs interviewed valued expert discourse as useful in the face of complexity. At the end of the day, however, the issue was about the scientific community, which justified its actions through appeals to its autonomy and societal utility. MPs might call the pharmaceutical industry evil, but they could not dare to question the integrity of Swiss stem cell researchers.

In conclusion, we can maintain that the stem cell research regulation decision-making process was of a relatively unstructured nature, but that the federal administration conceived it more as a semi-structured issue with conflicting values, attempting to depoliticize the issue through the procedural legitimacy of a policy process and the launch of a public debate campaign. Expertise was mobilized by the administration as an insurance for this strategy, and by advisory committees

tasked with foresight missions in this policy domain. Through a complex and unforeseeable chain of events and structural conditions, some of this expertise took a mediating role, with minor effects on policy design (Prof. Schweizer, NACBE), while the more pronounced positions of TA-Swiss were enrolled into the argumentation of the opposing minority.

Seven

Curbing Carbon Dioxide Emissions

7.1 Introduction

The year 1990 was full of promise for combatting climate change. After decades of research and scientific agitation, the fact that our planet's atmosphere is warming because of an increasing concentration of carbon dioxide (CO_2) had finally captivated the political imagination and catapulted the issue onto the political agenda. The still young Intergovernmental Panel on Climate Change (IPCCC) was about to officially present its first assessment report during a scientific conference of the World Meteorological Organization (WMO), to be held in Geneva during fall of the same year. It was in this context that the Federal Council authorized the Federal Office for the Environment (FOEN) to elaborate draft legislation concerning the reduction of atmospheric CO_2 emissions. This chapter looks at the role and consequences of scientific knowledge in the policy formulation of what eventually became the Federal Act on CO_2-emission Reduction (CO_2 Act). This law, only enacted in 2000, established the foundation of domestic climate change policy in Switzerland.

Swiss climate policy has continued to evolve since then, with Parliament later approving the introduction of a tax on CO_2 emissions engendered by burning fossil fuels for heating. Subsequently, the original bill was completely revised in anticipation of an international climate policy regime to succeed the Kyoto protocol. But it was during the 1990s that climate change was established as a political problem (internationally as well as domestically), and that Swiss climate scientists began to organize and to articulate political claims. This is why the present study focuses on the pre–2000 period only.

Four contributions in existing literature cover the CO_2 Act. Ingold (2008) uses

the advocacy coalition framework as well as multi criteria analysis in order to explain policy *output* under the CO_2 Act up till the mid–2000's. While also looking at the pre–2000 context, the 2002–2005 period is the central focus of this analysis (Ingold, 2008: 418). In a study commissioned by the Swiss Academy of Technical Sciences, Lehmann and Rieder (2002) investigate the role of global change science in policy formulation of the CO_2 Act. They offer detailed descriptions of the decision-making process, as well as organization and coordination between actors from science and the federal administration. But their study does not address the content of the policy itself. Thus, how such scientific knowledge ultimately came to bear on policy formulation is not looked at. Moreover, their analysis does not take into account the consultancy work done by research firms. Niederberger (2005) discusses the Swiss Academy of Natural Science's climate science advisory infrastructure. This treatment focuses on organizational specificities, and partly overlaps with Lehmann and Rieder (2002). Finally, Audédat (2004) presents an analysis of the domestic articulation of the climate change issue in terms of the science policy agenda that resulted from it. The present case study, however, asks different questions, which it investigates independently of these other studies.[1]

The remainder of this chapter is divided into five sections. The first section provides an overview of the major milestones within the pre–2000 decision-making process. The second section discusses the nascent energy policy domain and international climate policy coordination as two 'exogenous' elements that exerted a structuring influence on policy formulation and expertise mobilization. The following section analyses the commitments and perspectives of the federal administration and the Swiss climate science community, and links this to the deployment of scientific expertise. The penultimate section offers an account of where and how expertise became an object of contention, and the final discussion draws together the findings and discusses them in the context of the theoretical propositions formulated earlier.

[1]Karin Ingold kindly shared her field notes, which were a helpful asset in planning interviews. However, they do not constitute 'data' analyzed within this case study.

7.2 Policy synopsis

The making of the CO_2 Act is a two part story which began with the idea of introducing a tax on fossil fuels in order to reduce CO_2 as well as NO_x emissions caused by their combustion. Air pollution was the main concern at the time, especially since the 1986 clean air program was not effective enough. The Federal Office for the Environment (FOEN) sought to address this policy failure and asked the environmental policy consulting firm Infras for advice on clean air policy. The latter came up with the idea of a CO_2 tax (Interview XIV). Reducing CO_2 emissions, the argument went, reduces combustion of fossil fuels, which is the most important source of harmful NO_x emissions. Political support was not lacking as a draft policy report from fall 1990 shows. In fact, CO_2 emissions had gained political salience as, in October of 1990, the World Meteorological Organization (WMO) was about to hold its second conference on the climate. It was at this conference that the International Panel on Climate Change (IPCC) presented its first assessment report. The European Commission also thought about a CO_2 tax. Moreover, a CO_2 tax would be relatively easy to implement given that Switzerland imports all of its fossil fuels. Such fuels could be taxed at the border according to their respective carbon content.

The Federal Council approved the strategy (October 1990) and mandated FOEN with the elaboration of legislation. There was one important caveat, though. Fossil fuels are not only a pollutant, they are an economic production factor, and they are a source of fiscal income. Levying such a tax pitched environmental concerns against economic and fiscal interests. The Federal Council, the Federal Fiscal Administration (FFA), and the Federal Office for External Economic Affairs (FOEEA) took these interests very seriously. However, these actors did not perceive any credible progress on the European level to actually introduce some kind of energy tax, as the European Commission's plans gradually lost momentum. This nourished domestic fears that a Swiss 'solo effort' would disadvantage the domestic export industry, which would have to operate at a higher cost than their competitors.

In the absence of effective international policy coordination, this made domestic political support for a CO_2 emission tax elusive and contributed to the Federal Council abandoning an initial proposal submitted for public comment in 1994.

Close observation of the European Commission's intentions also led to intermittent consideration of an expansion of the proposal to include the taxation of electricity (after the EC announced a corresponding proposal in June, 1992). The federal administration explored scenarios containing an energy tax (i.e. not a tax on the carbon content but rather on the energy content of a fuel), which could, potentially, also be applied to electricity. A Federal Department of Home Affairs (FDHA) memo addressed to the Federal Council (Jan. 4, 1994) notes that informal feedback from economic organizations and political parties signaled resistance against taxing electricity. It further informed the Federal Council that the different policy alternatives are virtually identical in their impact on the environment, energy demand, and economic cost. The Federal Council followed FDHA's situation analysis and decided to submit only the CO_2 tax proposal for public comment.

At the same time the federal government was battling problems of fiscal policy which took precedence over any other tax-related policy proposal. The Swiss people rejected a necessary renewal of federal taxation competencies on June 2, 1991, because the government attached a proposal for the introduction of a value added tax (VAT). The federal taxation competencies were finally approved in a second ballot vote in 1993, after the VAT proposal was dropped. This rejection directly affected the CO_2 tax proposal, which was put on hold in order not to prejudice the second renewal attempt (Interview XIV). In addition, a significant public finance crisis developed during the early 1990s, and balancing the budget became a political priority. For that purpose the government sought to increase duty on petrol in order to increase fiscal revenue. Because the CO_2 tax did not pursue a fiscal motive, the project had to wait until the people validated the tax increase (ballot vote on March 7, 1993). Finally, in the spring of 1995, the FFA – a staunch opponent of incentive taxes on energy because it considered energy a taxable source of fiscal revenue – launched the idea of financing transalpine transportation infrastructure by increasing duties on petrol. By that time the proposal had already experienced significant loss of political support after having received negative feedback in public consultation.

The Federal Council proposal finally submitted for consultation in spring 1994 consisted of a tax on fossil fuels based on their CO_2 emission values. Two thirds

of the tax's proceeds would be redistributed to the population and to the economy, with one third being earmarked for financing environmental policy projects. The tax would be introduced in increments and energy intensive branches of industry would benefit from partial exemptions in order to avoid affecting their competitiveness on the world market. Furthermore, the official letter sent to the addressees of the consultation procedure (dated March, 29, 1994) made it clear that the proposal takes into consideration the recent increase of the petrol tax. For that reason, the option of applying a higher tax rate for *Treibstoffe* than for *Brennstoffe* – respectively, fuel for transportation and fuel for heating – was dropped.[2] This distinction is not so much about physical differences amongst different kinds of fossil fuels as it is about the subdivision of the economy into different energy user groups, each of which has different growth trajectories of energy consumption. The question of whether to make such a distinction, and how to make it, is politically salient as it engenders distributional consequences on who carries the tax burden.

The proposal drew wide criticism. It was denounced for its 'solo effort' ahead of major trade partners, as well as of the mixing of fiscal and behavioral incentive motives behind the partially redistributed tax proceeds. The need to do something about climate change was, however, almost universally recognized (and indeed was disputed only by the Petroleum Union [*Erdölvereinigung*] (cf. Hartl, 1994)). However, economic interests questioned the rationale of domestic climate change mitigation efforts, advancing cost and effectiveness arguments aginst this, especially with regard to the Swiss share of global CO_2 emissions, which is counted in per mills rather than percents (e.g. Fritsch, 1994). In the wake of the consultation procedure, a governmental delegation sought to salvage the proposal in bilateral negotiations with economic interest organizations. But just as no further support could be gained outside government, internal resistance – especially within FFA – increased, too.

The story's second part began in May 1995, as FOEN desperately sought to obtain the Federal Council's permission to finalize the proposal and submit it to Parliament, despite the political resistance. Meanwhile, an international policy agenda around climate change had materialized. The 1992 earth summit in Rio resulted in

[2] Because the terms *Brennstoff* and *Treibstoff* were persistent in the debate, but lack a clear English translation, I shall use the original German.

the United Nations Framework Convention on Climate Change (UNFCCC), which Switzerland ratified in December of 1993. UNFCCC did not contain specific emission reduction targets, but Switzerland (together with Austria and Liechtenstein) annexed a self-declared reduction target of minus 10 percent by 2000 compared to 1990.[3] A decisive shift came in April 1995 when the UNFCCC's first conference of the parties (COP 1), held in Berlin, resulted in a declaration to develop binding emission reduction targets. This 'Berlin mandate' would ultimately lead to the signature of an annex to UNFCCC during COP 3 in 1997, better known as the Kyoto protocol. Against this backdrop of domestic resistance and the newfound opportunity of the Berlin mandate, FOEN director Philippe Roch and Federal Councillor Ruth Dreifuss, debating strategy over a beer at the end of a FDHA senior staff retreat, decided for a reversal of strategy. No longer should the tax be the priority of legislation. Rather, the law should state a (to be defined) CO_2 emission reduction target and provide for the introduction of the CO_2 tax as a *subsidiary* instrument should existing and voluntary measures fall short of producing the necessary reduction (Interviews VI and XXIV).

In a May 31, 1995 decision, the Federal Council endorsed the new strategy and sent the administration back to work. It also decreed that the law was to be elaborated in close collaboration with interested parties, thereby giving official blessing to a process that had already started some months earlier. In fact, confronted with negative feedback from the consultation procedure, Federal Councillor Dreifuss and a FOEN delegation held direct meetings with the most important critics, whose endorsement was required to break gridlock.[4] Even before the consultation procedure ended, the delegation met with the economic interest group *Vorort*, trying to persuade it to endorse the (old) proposal. They also met with a group of 'industry captains' – top-level managers in Swiss industry – and consulted with the major political parties, as well as representatives of the oil, gas, and transportation industries. While these meetings did not produce a breakthrough, they lead to a series of confidential meetings between a FOEN delegation and industry represen-

[3]The same reduction target had already been domestically integrated into the energy savings program *Energie2000*, which the federal government launched after the 1990 adoption of the constitutional provision on energy (cf. Fritsch, 1994).

[4]This information is based on the meeting preparation files contained in the FOEN archive.

tatives under the auspices of the *Vorort*. It was the latter that primarily served as a forum for interaction and which introduced cooperation rather than the previous *ex post* consultation.

The timing of policy work now mainly involved coordination with other ongoing energy policy projects, notably the draft Energy Act and two submitted popular initiatives resembling the earlier discarded alternatives. The proposal's most contentious aspect concerned the splitting of the reduction target according to different economic sectors. While an overall ten percent reduction target was fairly uncontested (though judged insufficient by environmental organizations), much haggling went on within the administration, as well as between the project team and economic interest groups. Scenarios projected the biggest emission increase as coming from transportation, and the relevant interest group was fiercely opposed to sector-specific targets (they would have had to pay more). The *Vorort* advised sector-specific targets, because it feared that the tax would engender redistribution between different branches of industry. FOEN and FOEEA internally argued for such sector targets, too, against FOE's accusation of 'supporting plan economy' (Interview XVII). When the proposal was finally sent for public consultation, differentiated reduction targets between *Brennstoff* and *Treibstoff* were maintained. Predictably, this drew criticism. In the swift, second consultation procedure, another claim materialized: economic interest groups and the political parties close to them demanded that Parliament, rather than the Federal Council, should have the prerogative to decide if and when introducing the CO_2 tax was necessary to achieve the CO_2 emission reduction goal of minus 10 percent by 2010.

The CO_2 Act was finalized in March of 1997 and sent to Parliament for deliberation. Committee deliberation in the Council of States started that fall, shortly before the COP 3 meeting took place in Kyoto. The bill was barely contested; the Committee of Environment, Spatial Planning, Energy, and Transportation (CESET) of both houses did not even conduct hearings.[5] However, the parliamentary process took until October 1999, with the business passing three times between the two chambers because no agreement could be reached on whether Parliament or the Federal

[5]This is most unusual, but neither interviewees could recall such hearings having taken place, nor is there any documentary evidence proving the contrary.

Council would decide the moment for introducing the tax. Parliament secured this prerogative in the end. The law, now lacking much of its intended bite, was enacted in May of 2000.

7.3 Structuring elements

Policy formulation for the CO_2 Act was subject to influences from other domestic policy contexts as well as from international policy coordination. These influences include the constitution of the federal energy policy prerogative, and its later development; international climate negotiations, including the adoption of the United Nations Framework Convention on Climate Change (UNFCCC); the fiscal crisis of the early 1990s, and the need for infrastructure financing; and industrial policy regarding the competitiveness of export-oriented manufacturers. As discussed, these elements engendered conflicting priorities and thereby substantially shaped the policy process. As we shall see in section 7.4, they came to determine the organization of policy work itself by forcing coordination among different public and private actors. They also brought into being an infrastructure of energy policy modelling, on which policy formulation drew. In what follows, I further outline the energy policy field and international climate change negotiations between 1990 and 1997 with their structuring effects on the action situation of interest.

Energy policy and models

Energy policy has only been within the competency of the federal government since 1990, when the necessary constitutional article successfully passed a ballot vote. But it took two attempts to do so. The first oil shock prompted Parliament and the Federal Council to set up an *ad hoc* expert committee with the task of developing regulatory recommendations for steering energy consumption. The resulting master plan *Gesamtenergiekonzeption* (GEK) was publicly presented in 1978 (Kohn, 2003) and formed the basis for further discussion of the empowerment of the federal government in energy policy. However, the people rejected the developed constitutional provision in a 1983 ballot vote. In parallel to the energy scarcity issue, an anti-nuclear protest movement formed in Switzerland whose focus was the planned

construction of a new plant in the town of Kaiseraugst.[6] In the wake of the 1986 Chernobyl accident, another *ad hoc* expert committee was formed to develop and assess different energy scenarios about the possibility of a moratorium or exit from nuclear energy.[7] These scenarios, published in 1988, showed that an exit was possible, albeit at high economic cost. Not wanting to acknowledge these findings, three members of the group left in public dissent. They were all professors whom Interviewee XVII describes as 'pro nuclear'. It was through Chernobyl that the project of federal energy policy competencies finally found traction and won public approval in a 1990 ballot vote. In the same vote, and against the will of the Federal Council and Parliament, the public also accepted a moratorium on nuclear energy (Interview XVII).

This foundational episode of federal energy policy contributed to the development of a regime of energy modeling expertise, which, after being consolidated in the early 1990s, has remained almost unchanged. Model calculations from this regime have informed virtually every energy policy decision made, from projects such as the CO_2 Act to more recent post-Fukushima energy transition plans. This regime comprises two parts. First, there is the process through which the scenarios a model is supposed to compute are determined. Secondly, there is the technical implementation of these assumptions and the development of the actual model.

The pre–1990 experience with energy modeling led to two lasting consequences. Firstly, having *ad hoc* expert commissions develop the scenarios and assumptions revealed that this is a highly political process. The members of the GEK committee as well as the 'Kaiseraugst Demand Assessment Committee' were chosen according to political representation criteria. The results reflected this staffing process. Subsequently, Federal Councillor Schlumpf wanted a purely technical committee, thinking that this would solve the 'result by appointment' problem. But it didn't, as the post-Chernobyl energy scenario expert commission demonstrates. Professors, too, put values before facts on occasion. At FOE, the last minute expert dissent (for covert political reasons) was not received well, and led to the decision to internalize

[6] A discussion of pre–1983 energy policy is offered by Mironesco et al. (1986) and Mironesco (1993). On the history of nuclear power in Switzerland, see Kupper (2003). The Kaiseraugst project faltered and the power plant was never built.

[7] A similar expert group had already developed electricity demand scenarios as part of the licensing process for the Kaiseraugst power plant (Interview XVII).

scenario development. Under this new regime, the computation of further energy scenarios was completed in 1994 and updated in 1998 (Interview XVII).[8] Secondly, the federal administration never acquired its own technical competency to develop such models. The development of models is strongly driven by availably computing power, which was minimal in the 1970s. While university-based academics contributed early models (e.g. the University of Geneva's 'Centre universitaire d'étude des problèmes d'energie'),[9] the advent of so-called 'bottom-up models' established the consultancy firm Prognos as a key player (Interviews XVII and XXVII). Bottom-up models are capable of a very high resolution and are mathematically simple. However, they are very labor intensive and require significant detail and expertise on the data. FOE first started to collaborate with Prognos after Chernobyl and has done so ever since. Prognos is now in a monopoly position concerning bottom-up models in the Swiss and German market (Interview XXVII). Processes predating work on the CO_2 Act had thus already structured both the expertise available and the interaction modalities between the administration and Prognos, as an expertise provider.[10]

The development of a federal energy policy also came to influence policy work on the CO_2 Act structurally. While FOE was a partner on the project from 1990, it was after the strategy reversal that the federal government started to coordinate the timing of different energy policy projects. On the one hand, there was the draft Energy Act, whose treatment was to be synchronized with the CO_2 Act. On the other, an initiative committee raised enough signatures to submit two energy-related popular initiatives in 1995. One aimed at taxing non-renewable energy, with the proceeds being redistributed to the population. The other proposed an energy

[8]The early 2000s saw another update (published in 2005), which acquired political saliency with the Fukushima accident. For these new scenarios, a stakeholder panel was involved, however with less competencies than the pre–1990 commissions, but replicating similar dissent (Interview XXVII).

[9]Interviewees provided several explanations about the predominance of commercial providers. While academic providers are cheaper, there is less consistency in availability from university institutes. Consultancies deliver on time and are professionally run. Moreover, the academic offer is very person dependent. The retirement of a single professor can lead to tremendous loss of know how. Some interviewees also estimate that doing advisory work has lost prestige in the Swiss university landscape, which they see as increasingly paced by international competition for excellence.

[10]Each update of the energy perspectives constitutes a multi year project in which several consultancy firms are implicated. For instance, just like Prognos, Infras has also been a long time partner in that enterprise. Interviewees XVII and XXVII estimate the costs of such an update between CHF 2 and 3 millions.

tax as a way of raising funds for the development of alternative energy. As FOEN memos show, Federal Councillor Dreifuss sought to convince her colleagues to declare the CO_2 Act an indirect counter proposal to the initiatives, but the Federal Council ultimately recommended the initiatives' rejection without any counterproposal. Nonetheless, the draft Energy and CO_2 acts, as well as the popular initiatives, became the foundations for different energy scenarios which needed to be computed and evaluated.

The 'domestication' of climate policy

The synopsis has established how the international climate policy agenda around UNFCCC provided repeated opportunities for the domestic CO_2 tax project. The main events during the 1990s were the second WMO world climate conference in 1990, the Rio earth summit in 1992, COP 1 in Berlin in 1995, and COP 3 in Kyoto in 1997. These events had both a direct signaling effect on the Swiss and an indirect effect by shaping the EC's policy strategy. It was the latter's announcements in the wake of UNFCCC conferences that had a strong effect on Switzerland.

Other than these timing effects, there are surprisingly few linkages between the UNFCCC process (also coordinated by FOEN) and the CO_2 Act project. Organizationally, the climate portfolio gradually shifted from FOEN's international division (established in 1988 in connection with Switzerland's IPCC collaboration), to become part of the more nationally focused 'environment and economy' division in 2001, and ultimately becoming the subject of its own division in 2008 (Lehmann and Rieder 2002, Interview XIV). There was some personal overlap between the CO_2 Act and FOEN's UNFCCC team. However, analytical projects pursued by the latter in preparation for the Rio conference do not appear in records documenting the policy formulation process. For instance, in 1989 the Federal Council tasked the interdepartmental working group GIESC to elaborate a state of the art report on Switzerland and climate change. GIESC's membership included scientists from the Swiss Academy of Natural Sciences and, after some delay, the group presented its final report in 1994, after which it was disbanded. But the GIESC initiative and its findings find no mention in FOEN memos connected to the CO_2 Act, until they are described in the dispatch (ca. 1996).

7.4 Actors and commitments

Two groups of actors were primarily involved in decision-making about the mobilization of scientific expertise and this section analyzes their perspectives as well as commitments in the policy arena. This also entails the description and analysis of the different instances of mobilized scientific expertise. The first group consists of civil servants from different branches of the federal administration, who were in charge of policy formulation. The second group consists of climate scientists, loosely organized under the umbrella of the Swiss Academy of Natural Sciences. Political parties as well as interest groups are missing because interview testimony and documentary evidence indicate that they did not mandate their own scientific expertise.[11]

A summary of mobilized expertise

Table 7.1 is a complete inventory of expert reports commissioned in connection with the policy formulation process of the CO_2 Act. This inventory has been compiled based on interview testimony and FOEN's internal archive. The latter did not contain all mentioned reports, but references to them appear in meeting minutes, memos, and draft policy proposals. All these reports were mandated by the federal administration and mainly authored by specialized consulting firms. The reports that represent model calculations are linked to the larger and recurrent project of energy perspectives, led by the FOE (cf. section 7.3). However, the pre–1995 reports were administratively distinct sub-projects. They drew on the same models as the energy perspectives, but were much smaller in scale and operated on a narrower timeline (less than one year). The mandating agencies closely supervised these tasks (Interview XIV).

Infras, one of Switzerland's oldest environmental policy consultancy firms, developed the listed instrument tool kits. The first such tool kit addressed the policy effectiveness problem in the domain of the federal clean air conception. It laid out a series of instruments for further political evaluation, with the CO_2 tax being one of

[11] In fact, there was a rather clear left-right dividing line between greens and social democrats, who sided with environmental groups, and the 'bourgeois bloc', who emphasized economic interests (Ingold, 2008; Lehmann and Rieder, 2002).

Table 7.1: Scientific expertise produced in the making of the CO_2 Act

Producer	Issue	Communication	Principal	Publics
Infras (ca. 1990)*	Alternatives for enhancing clean air policy effectiveness	N/A	FOEN	Administration (FOEN)
Prognos (Dec. 1991)	Economic impact of a CO_2 tax	Report	FOE & FFA	CO_2 tax project team
University of Geneva (Feb. 1992)†	Energy perspectives 1990–2025 in regards to CO_2 emissions	Report	FOE, FOEN & FFA	CO_2 tax project team
Prognos (Sep. 1993)‡	Impact of different policy instruments on energy demand and economic development	5 volume report, released to the general public during 1994 consultation procedure	FOE, FOEN & FFA	CO_2 tax project team
Infras & FOEN (Jan. 1995)	Variants for reducing impact of CO_2 tax on energy-intensive industries	Mimeo	FOEN	FOEN
Prognos (Nov. 1996)	Impact of Energy Act, CO_2 Act, and popular initiatives on energy demand and economic development, 1990-2030	Report & detailed explanation in governmental dispatch	FOE	Energy policy projects of the administration

Notes:
*No copy obtained, but mentioned by Interviewee XIV; Publication: ca. early 1990.
†No copy obtained, by cited in a governmental policy report dated March 31, 1992; The report is based on the larger 'energy perspectives' project run by FOE, but required additional calculations specific to the CO_2 issue. The 'Centre universitaire d'étude des problèmes d'energie', a partner in the energy perspective project, provided the model for these calculations. It would later be substituted by Prognos which had more powerful models.
‡The report has been commissioned for the CO_2 tax project, but there are no indications by whom.

them. The second policy instrument-related report, produced by FOEN in collaboration with Infras, addressed the issue of how the impact of the proposed CO_2 tax on the competitiveness of energy intensive industries could be minimized.

In addition to these reports, unreleased draft policy documents contain references to the scientific literature concerning the constitutionality[12] as well as the regressive nature of an incentive tax. Further, the dispatch of 1997 (Schweizerischer Bundesrat, 1997) contains a detailed scientific perspective on climate change. The

[12]Because each tax requires a constitutional provision, the case of a steering tax with partial, as opposed to complete, refund may invite contestation. Whether or not the Constitution's article on environmental policy provides for allocating such tax revenues for environmental policy programs was not challenged during the CO_2 Act, presumably because the final proposal eliminated a partial earmarking of the proceeds. During the 2000's when the tax was actually introduced, earmarking its revenues became an option again and engendered such a constitutional debate (Interview XIX).

latter, however, has no link to the policy formulation process other than to illustrate the problem. Meeting minutes show that it was written up by a civil servant *after* the material content of the proposal had been finalized.

The federal administration

There is no unified commitment underlying policy-making within the federal government. In fact, finding support inside government appears to having been almost as hard as doing so among economic interest groups. Formulating the CO_2 Act did not only take a long time, it was also a complex process because of the interdependencies an energy tax entails. This is directly reflected in the project's organization. While the Federal Office for the Environment (FOEN) led the project, phase one (1990–1995) also saw the participation of the Federal Office of Energy (FOE), the Federal Fiscal Administration (FFA), and the Federal Customs Administration (FCO). With the strategy shift in May 1995, FCO was no longer a participant, and was replaced by the Federal Office for External Economic Affairs (FOEEA). There was a cooptation motive for inviting the participation of FFA and FOEEA, as the interests they represented – respectively, fiscal income and economic competitiveness – were potentially at odds with an energy tax for ecological reasons. While this inclusion did not attenuate such opposition, Interviewee XXIV experienced FFA and FOEEA civil servants involved in the project as being supportive and cooperative. Beyond that circle of project participants, several internal FOEN memos, dating from various states of the process, report perceptions that the CO_2 Act did not enjoy exceptional popularity among the wider federal administration.

The project depended heavily on the advocacy of FOEN and the Federal Department of Homeland Affairs (FDHA), to which FOEN belonged until the end of 1997.[13] It was the FDHA head Flavio Cotti, supported by the Federal Council, who declared that Switzerland intended to stabilize CO_2 emissions before 2000, based on a 1990 baseline (Blattmann, 1995), at the WMO's second climate conference (Geneva, 1990), as well as the Rio earth summit (1992). In fact, in 1989 the Federal Council had already mandated the interagency working group GIESC to elaborate

[13] Starting in 1998, just weeks after COP3 in Kyoto and in the middle of the Council of States' deliberation of the CO_2 Act, FOEN was transferred into the Federal Department of the Environment, Transport, Energy and Communications.

a national climate change strategy. Ruth Dreifuss, who succeeded Cotti as FDHA head, continued that engagement after 1993. Archival records indicate that she attended COP2 in Geneva and Interviewee VI recalls that she proudly presented the draft CO_2 Act during COP III in Kyoto. Philippe Roch, who became FOEN director in 1993 after having worked at WWF, also strongly supported the project. Interviewee XIV portrays FOEN as a rather committed community of civil servants with very low staffing fluctuations. S/he further remembers that discussions about a CO_2 tax coincided with a larger paradigm change in environmental policy. While the latter was dominated by a legalistic and regulatory thought style until well into the 1980s, economic policy instruments slowly started to gain traction. This would eventually lead to FOEN increasingly hiring economists.

It can be argued that the repeated adaptation of the project's declared policy goals is an expression of the lack of a strong constituency in favor of a CO_2 tax. First, the draft law indicated compatibility with the European Commission's plans and the introduction of modern economic policy instruments as chief justifications.[14] Further, clean air policy was added as a motive, because less fossil fuel consumption also reduces the emission of other pollutants. Then, as Switzerland ratified the UNFCCC in 1993, a CO_2 tax was portrayed as contributing to the convention's goals. After the change of strategy in 1995, earlier justifications were dropped altogether and the UNFCCC became the dominant framework of justification. However, when the slowing progress of the Berlin mandate invited doubts as to a successful agreement containing binding reduction targets, Dreifuss urged industry representatives to endorse the project regardless of an international agreement, given that cost models showed no negative economic impacts from a solo initiative. Thus, while a committed core upheld the belief in the necessity of CO_2 emission reduction, its achievement required substantial political maneuvering.

Working with models

Different kinds of econometric models computed by contractors were a key analytical resource for policy work. They were used to evaluate different policy instru-

[14]The Federal Council made it already clear in 1990 that any such tax would have to take into consideration international policy coordination.

ments in terms of their impact on energy consumption and on economic development. This evaluation of policy instruments informed strategizing by the director-rank steering group. This group, and also the subordinated project team, was staffed by representatives of the implicated agencies (cf. section 7.4). Regarding modeling, there was a clear division of labor, as meeting minutes from the project's second phase show: scenario decisions were taken by the steering group and operational supervision of the modeling projects was taken care of by the project team. Collaboration between policy workers and the model contractors was close and, as Interviewee XIV recalls, at times rather time consuming for the administration.[15]

The policy-making and modeling processes interacted in different ways. The CO_2 emission reduction and cost scenarios the models produced fed back directly into the decision-making process. There was no single big result that would dramatically affect the project's direction. Rather, multiple recursive loops between model input decisions and computation results produced decisions, which, ontologically, are best defined as empirical-strategic 'hybrids'. The process of scenario elaboration, justification of alternative selection, and determination of reduction targets illustrates this well.

As a general pattern, it was the policy process that generated scenarios to be evaluated in terms of environmental and economic impact through model calculations. During phase I, initial consideration of a CO_2 tax only broadened into a discussion of whether or not to include *Treibstoffe* (i.e. petrol), and more substantially, the evaluation of scenarios under which energy content, rather than emissions, would be taxed, including electricity. As elaborated, it was the domestic and international context that brought up these scenario changes, not the policy project team. The latter merely reacted to these changing circumstances. During phase II, the steering group modeled the scenarios to be evaluated on the enlarged energy policy agenda (draft Energy Act, draft CO_2 Act, two popular initiatives, etc.). There was a baseline scenario (I), a scenario that assumed the enactment of all government proposed

[15]The close supervision of expert mandates – a routine operation at FOEN, Interviewee XIV, XVI and XXIV's testimony suggests – is the administration's solution to quality assurance. The process, as outlined by Interviewees XIV, XVI and XVII, consists in a kickoff meeting, where the expertise provider explains his/her understanding of the mandate and enabling the mandating agency to get a sense whether both parties have the same questions in mind. This is usually followed by an intermediary and a final report, with intense discussion of the results at each stage.

measures, but without the introduction of the CO_2 tax (IIa), and a scenario that presumed the introduction of a CO_2 tax (IIb). Further, the contingency of the popular initiatives being accepted shaped yet another scenario (III). An alternative scenario (IV), presuming higher reduction targets, was dropped for lack of time.

During phase I of the project, determining the value of the proposed tax rate started out from a rough suggestion of somewhere between one third and one sixth of the cost the end user would pay for a given fossil fuel. In addition, there were two further considerations: petrol should not become more expensive than in neighboring countries, lest people fill their tanks across the border (and not the other way around). Moreover, the tax rate had to be low enough in order not to affect macro economic conditions, or to make Swiss industrial production unilaterally more expensive than abroad. In its 1991 report, Prognos criticized the assumed tax rate as too low, compared to IPCC scenarios. Nonetheless, it was maintained. The computation of all possible scenarios (emission-based tax vs. energy content-based tax) then revealed that they were equivalent in their environmental and economic outcomes, and indicated that there was no negative economic outcome. These results were used by the Federal Council to publicly justify its preference for the CO_2 tax, which it had chosen primarily in order to avoid political resistance. The Federal Council also decided to publish the entire report.

The new strategy required the determination of a CO_2 emission reduction target to be written into the law. The federal government had made previous CO_2 emission reduction commitments as part of UNFCCC and the domestic 'Energy 2000' program (cf. Fritsch, 1994). But when the project team took up work in August 1995, all eyes were locked on the Berlin mandate and the anticipation of Switzerland's potential reduction obligation thereunder. The Berlin mandate was thus the first of a list of criteria to guide the identification of a suitable reduction target. A memo suggested additional criteria such as previous reduction efforts by industry, as well as technical feasibility. These criteria were also discussed in the FOEN/*Vorort* working group and approved by the latter.

There was one more element. It transpired that modeling a reduction target of more than 10 percent would take a full year (!), due to recursive effects within the model. As it turned out, even modeling the non-recursive scenario would delay

the results by some months. Such time pressure was a perpetual concern, as the policy project was required to react to the multiple opportunities and constraints engendered by the interdependent energy policy field. Eventually, the 10 percent target prevailed. Yet, when it came to winning stakeholder support for the reduction target, the administration mobilized 'scientific evidence about climate change' as another criterion, hitherto missing from the list. The use of this argument was decided by the project steering group and subsequently appeared in files assembled in preparation of stakeholder meetings. It also appeared in a draft version of the dispatch, when the contributing author identifies the reduction target as merely a first step in the right direction, which is as of yet 'insufficient' from a scientific perspective.

The question of whether or not *Brennstoffe* and *Treibstoffe* should be subjected to different tax rates was a point of contention throughout the policy process. In the second phase, it became a subject of debate within the steering group (FOEN and FOEEA against FOE), and a central concern of economic interests. It was this political debate that prompted the decision to model different alternatives, with or without a split between the two. The calculations showed that the emission trend of *Brennstoffe* decreased without a tax. But scenarios of the transportation sector projected strong growth. This nurtured a scenario of achieving the desired 10 percent reduction, but with different sector targets. This split model assumed the stabilization, but not the reduction, of the *Treibstoff* demand, with a higher *Brennstoff* reduction compensating the more modest target of the first sector. While the demand for such a split by economic interests had a clear distributional motive, FOEN ultimately justified it in communication with stakeholders as 'factually legitimate'.

Finally, both the project team and the *Vorort* urged for the computation of the economic cost of a 10 percent reduction target. Just as in 1994, the result was that the effects were slightly positive, with only the energy and transportation sector suffering a decline. When Dreifuss met again with the 'industry captains', before the proposal was finalized and amid slow international progress, she urged them to endorse the proposal, regardless of whether binding reduction targets could be agreed on internationally. After all, went her sales pitch, there were no adverse economic implications, only domestic benefits to be reaped.

These vignettes clearly attest the contingent nature of how modeling and political decision-making interact to produce a decision. It is quite conceivable that if model calculations had resulted in different values, political strategizing and justification would have taken a different road. At the same time, the use of such models as devices also artificially constrained the scenarios. Certainly, there had always been the political will to minimize the tax's potential effects so as to not affect economic competitiveness. But the (time) constraint imposed by the model also ensured that the results could not have been that surprising. Staying within the boundaries of a 10 percent reduction scenario meant that no macro economic feedback would be produced. Consequently, the results of the economic impact model was rather unsurprising, given that the tax rate had to be set low enough to preclude macro economic effects in the first place. But there is no evidence that actors were aware of this, or that it constituted a deliberate strategy.

Climate science advice, a voice in the making

A strikingly counterintuitive fact about the CO_2 Act's policy formulation process is the near absence of climate change advice. It is counterintuitive because climate policy, as we know it, is inconceivable without the scientific inquiry that originally established and drew attention to the issue of global warming and its anthropogenic cause. It is also counterintuitive considering FOEN's strong commitments in the matter. But, with one exception, meeting minutes and memos reveal no traces of hearings with climate scientists held in connection with policy formulation, either within the administration or in Parliament. Interview testimony also backs this up (Interviews VI and XIV).

There was no lack of interpersonal contact between scientists, organized under the umbrella of the Swiss Academy of Natural Science (SANS), and the federal administration. In fact, as archival records show,[16] the previously discussed post-Chernobyl energy scenario expert committee had already solicited Hans Oeschger's opinion. Oeschger was an internationally renowned climatologist who pioneered climate reconstruction with ice cores from Antarctica and Greenland as early as the 1960s. FOEN's former director Bruno Böhlen, predecessor to Philippe Roch,

[16] BAR E8190C 1990/2002 Bd. 11.

also maintained close contact with some scientists (Interview XXV). Representatives of the federal administration also participated in a SANS forum, held in 1987 in Gletsch, which resulted in the establishment of ProClim, SANS' climate change platform (Lehmann and Rieder, 2002: 31). ProClim later became a partner in the administration's interdepartmental climate change group (GIESC). ProClim ultimately turned into an organizational platform of the Swiss climate change community, after the aspiration of organizing its own climate research project failed. Instead, such research was funded by SNSF through the 'National Research Project' (i.e. NRP 31) and 'Priority Program' (PP Environment, NCCR Climate) frameworks, not the SANS funding initiative (Lehmann and Rieder, 2002: 31).

While certainly cognizant of these developments, the CO_2 Act project did not reach out to climate scientists.[17] It was on the initiative of SANS/ProClim that some contact was established by 1996. Firstly, ProClim brokered a meeting between a FOEN delegation and some 20 scientists from the major Swiss universities in order to discuss the draft CO_2 Act. This meeting came at the end of a series of talks between FOEN and the major economic and environmental stakeholder groups, held in spring of 1996 in order to present the new policy proposal. But unlike the other talks, the administration had not planned to hear the scientists' opinions (Interview XXIV). Judging by FOEN's record of the meeting, not much importance was attributed to it. The minutes of a project meeting in the wake of this hearing conveyed, in four lines of text only, that the scientific community broadly approved of the proposal.

It was similarly in 1996 that SANS started to lobby the Federal Department of Homeland Affairs (FDHA) for the establishment of an advisory body on climate change. SANS imagined such a body as being close to the scientific community, a kind of domestic IPCC. FOEN director Roch, however, would have none of it. Interviewee VI recalls that SANS, thanks to an interpersonal connection and a late night phone call, managed gain the support of FDHA head and Federal Councillor Dreifuss, who endorsed the idea and granted the necessary funds. Thus the Advisory Body on Climate Change (OcCC) was born. Unlike an extra-parliamentary commis-

[17] Swiss scientists were part of UNFCCC delegations at least since COP II in Geneva. Moreover, they have also actively participated in the IPCC since the second assessment report (Interviews XIII, XXIII-XXV).

sion, SANS positioned OcCC in the proximity of the scientific community, sharing the same secretariat with ProClim, and in the beginning even the same president. Moreover, OcCC was designed as a *scientific* commission that would issue consensual statements and admitted representatives from the federal administration to the ranks of membership in a consultative capacity only (Interviews XIII and XXV). Lehmann and Rieder (2002) and Niederberger (2005) deliver somewhat celebratory accounts of OcCC. Others are more pessimistic. Interviewees XIII and XXIII somewhat disappointedly attest the administration's failure to take advantage of OcCC's services. While agreeing, Interviewee XXIV reminds us that this is a rather typical condition of a federal advisory commission, where initial mission zeal gives way to resignation about lacking political relevance.

ProClim launched yet another initiative when it established the Parliamentary Group on Climate Change together with Gian-Reto Plattner. Plattner, a physics professor and Councillor of States for the Social Democratic Party, was one of the most outspoken political backers of climate change legislation. He also chaired the parliamentary committee on the environment (CESET) when the CO_2 Act was deliberated therein. Like many other parliamentary groups, the climate change group organizes three events per year while Parliament is in session.[18]

This brief overview shows that more and better organization certainly strengthened the establishment of a climate advisory voice. However, it also demonstrates that organization alone cannot solve the problem of political relevance, even if the recipient is not of a contrary opinion. Therefore, claims that better interfaces solve the relevance problem (e.g. Lehmann and Rieder, 2002; Niederberger, 2005) should not be overemphasized. Nevertheless, regarding the CO_2 Act, these mobilization efforts came too late to have a material influence on the proposal.

[18] An event of the parliamentary climate change group comprises two presentations on climate-related topics, rounded off with discussion (Interview XIII). The Energy Forum, another such group, but defending the interests of the energy industry, also hosts such meetings. Its president at the time, Councillor of States Vreni Spoerry, was also member of CS' environment subcommittee. The forum's vice president, National Councillor Peter Baumberger, spearheaded the industry's demand that Parliament and not the Federal Council receives the prerogative to introduce the CO_2 tax under the CO_2 Act.

7.5 Contested expertise

Two consultation procedures, two waves of consultative meetings with stakeholders, an administration-economy working group, and the parliamentary process: this all provided ample opportunity for negotiations between the federal government and civil society actors. Yet the data documents only a few instances when scientific expertise was at stake. Climate change was hardly a subject of contention, with the exception of some interest groups. In their responses to the first consultation procedure in 1994, automobile clubs (ACS, TCS), the road transportation association, and the petrol union discussed climate change at some length. None of them denied the increasing atmospheric concentration of CO_2, yet, by citing newspaper climate science coverage (e.g. from the *Neue Zürcher Zeitung*), they advanced the argument that the anthropogenic influence is uncertain. Moreover, in reference to the Rio summit and the IPCC's summary for policymakers, they claimed that these constitute *political* and not scientific declarations. The *Vorort*'s statement also contained a discussion of climate change, ultimately agreeing that precaution is in order, but that domestic measures would be inefficient. Consequently, when policymakers from the federal administration met with the transportation industry group in March of 1995 in order to negotiate its way out of gridlock, it came prepared with the latest IPCC results.

Model calculations of the economic impact of a CO_2 tax, prepared by Prognos, developed into a briefly contentious episode. Since these computations demonstrated a slight positive effect of the 1994 proposal, the Federal Council was happy to make the report publicly available. In a *Neue Zürcher Zeitung* (NZZ) article entitled 'Consequences of a CO_2 tax for the economy, a study on shaky foundations' (my translation), two professors from the University of St. Gallen attacked the report as 'counterintuitive' and methodologically flawed (Graf and Schlange, 1994). This occasioned FOE director Kiener to send them a written reminder of how welcome confidential criticism is, but how unhelpful it is in public, especially during the consultation procedure. In an internal memo, FOEN analyzed every single point of criticism and concluded that the attack was unfounded. Nonetheless, the Prognos authors of the original report published a reply, also in the NZZ (Masuhr and

Schlesinger, 1994). At stake was the so called 'double dividend', which claims that environmental measures may have positive economic outcomes. Such a claim is at odds with the conception of a linear relationship between economic development and energy consumption. While this public encounter had no discernible consequences, it was not the last time the double dividend would be discussed in the pages of the NZZ.

7.6 Discussion

The analysis has thus far shown that, due to the multiple interdependencies with other policy domains engendered by a fossil fuel tax, policy formulation on the CO_2 Act took almost seven years. During that time, FOEN and SANS – as the two key actors regarding expertise mobilization – barely changed their policy-oriented commitments. The issue and the underlying conflict lines remained essentially stable. Yet, FOEN and other participants in policy formulation from the federal administration were forced to adapt their strategy and engage in extensive negotiations with stakeholders that far exceeded the framework of a simple consultation. Ultimately, it was international policy coordination under UNFCCC and the Kyoto protocol that enabled the project to find closure, but not without economic interests and their allies in Parliament forcing an exit option into the law by taking away the Federal Council's prerogative to decide on the introduction of a CO_2 tax, should the set emission reduction target be missed. In what follows I further refine the case study's findings and discuss them within the framework of the theoretical propositions articulated earlier. This begins with the discussion of issue structure and the characterization of action situations. I then turn to the rationales underlying expertise mobilization and finish with consideration of the consequences of this expertise on the policy formulation process.

Action context

It can be argued that the issue's almost unwavering stability, despite multiple intervening constraints and opportunities, originated from its semi-structured nature. There was agreement on the scientific evidence at stake. The science of climate

change, so central for the legitimation of policies to reduce energy consumption and curb CO_2 emissions, was barely present in the debate. This is true for the policy formulation process within the federal administration, where the fact of climate change was never subject to debate as part of the policy formulation process (but served only as an argument in interactions with stakeholders, and as justification in the dispatch). In addition, with the exception of the transportation sector, the scientific evidence for climate change was never seriously contested, either by the *Vorort* or other interest groups. In Parliament, only a small minority mounted such challenges, remarking that – in analogy to doomsday scenarios of the acid rain debate – the forest still stands. Interviewees XIII-XVI all agree with this assessment, not without some astonishment in retrospect.

There was less agreement, though, concerning the values at stake. To use Interviewee XV's terms, while there was a general consensus that Switzerland had a responsibility in the matter 'beyond the shores of lake Zurich', there was intense debate about how to live up to this responsibility. Environmental interests and FOEN were convinced that this responsibility starts with domestic reduction of energy consumption. Others, for pragmatic or self-interested motives, contended that climate change requires a global solution, with domestic measures having only a ridiculously small effect given Switzerland's minuscule share in the global emission pie. For the most part, the latter argument was motivated by concerns of economic redistribution, should Switzerland introduce a unilateral CO_2 tax. Economic impact assessment computations could do little to dissipate this specter, regardless of its positive projections.

This stable issue configuration is reflected in the action situations. Given the lack of a popular referendum and the concentration of the government-society dialogue on the organized stakeholder community, interactions largely focused on the policy subsystem. It was only with the first consultation procedure, in 1994, that this community became actively enrolled in policy negotiations. But the contours of the CO_2 tax proposal had been publicly known earlier. More importantly, the Federal Council decreed as early as 1990 that unilateral action must take into consideration the Swiss export industry's competitiveness. Hence, the government's general appreciation of the situation was rather static. While certain aspects of the

policy proposal required concretization, the government's perception of the situation was never cast as uncertain. Yet at times, the federal administration turned into an action situation of its own, due to the interdependent nature of the issue. As far as expertise mobilization is concerned, its administrative principals always acted in concert. This supports the conclusion that the entire decision-making process took place in a single and stable action situation.

Causes of expertise mobilization

Given the prevalence of a single, stable, and semi-structured action situation, observed patterns of expertise mobilization are not counter to theoretical expectations. To begin with, the marginal role of climate change science as a voice that the administration summoned only for battling or preempting challenges to the CO_2 emission reduction commitment can be explained by the lack of a salient domestic controversy about the science of climate change. Given that multiple formal and informal connections between the administration (especially FOEN) and SANS had existed since at least the 1980s, it is doubtful whether earlier and better organization of a climate change advisory forum would have fundamentally changed this situation, as Lehmann and Rieder (2002) claim. Rather, in the absence of contestation, the justification repository – which included the ratified UNFCCC – was sufficiently well stocked to make an external scientific voice superfluous. To further extend the argument, such a voice could well have proven counterproductive in finding closure, given that the 10 percent reduction target was indeed judged to be insufficient by the scientific community.

The persistent use of model-driven scenarios constitutes a different case from climate science. As established, the organization of modeling work and the contracting partners of the federal administration in this enterprise were shaped by factors exogenous to the CO_2 Act policy arena. Hence, the question of whether the search for an external – and thus presumably neutral – voice motivated these mandates[19] cannot be divorced from this structurally given energy policy modeling regime. At the same time, the modeling mandates delivered, especially in the first

[19]Interviewee XIV reports that the administration's policy makers were generally eager for such an outside confirmation, especially as business moved into Parliament.

phase, were specifically for the CO_2 tax project, which nonetheless depended on the infrastructure in place. Archival records suggest that the primary function of these scenario calculations was to determine whose political interests were at stake, which puts special emphasis on the modeling of a policy instrument's economic impact. Although there is no direct evidence available on the decision-making process concerning the mandating of these scenarios during the first phase, intermediary draft policy proposals put more emphasis on economic rather than ecological questions. Further, the first consultation procedure saw criticisms of the economic rather than the ecological scenarios. Finally, as the proposal neared completion in 1996, both the steering group and the *Vorort* urged the calculation of the proposal's economic cost. Given the strong emphasis on redistributive issues from the beginning, this state of affairs is also not surprising, given the theoretical assumptions.

Consequences of expertise mobilization

Not having been actively integrated by the federal administration into the policy formulation process, climate change science could not have produced any effects on policy or politics. Energy models, however, were mobilized and consequently their effects have to be assessed. Qualifying the consequences of the mobilization of these expertise resources is not an easy task. For a start, I have coined the term 'empirical-strategic hybrid' in order to capture the interlacing of political decision-making and the modeling process. Some decisions may or may not have been different with models arriving at different conclusions. But such musings are of little relevance, for models do not produce some empirical 'truth'. They merely generate scenarios based on assumptions that are necessarily value laden. FOE representatives, for instance, were well aware of this and repeatedly cautioned fellow steering group members against placing too much trust in the models as a prediction tool. Ultimately, these hybrids were highly opportunistic constructs and, should their argumentative performance fail, there was always the backup argument that the CO_2 tax would do no economic harm. The point is neither that these model computations produced unnecessary information, nor that they were flawed. Yet as representations of always multiple and possible futures, such scenarios cannot live outside a normative interpretative context. In that sense, the observed hybrids con-

stituted valuations of such possibilities. Valuation, however, escapes deterministic necessity. In one instance, the deployment of models, paired with time constraints, limited available computing power, and particular human resources led to the constraint that only a 10 percent reduction scenario could be calculated. I do not suggest that this limitation is responsible for why a 10 percent reduction was written into the law, rather than some higher value. There were other political reasons that better explain this target value (e.g. the Berlin mandate). Nevertheless, it illustrates that analytical tools, like any technology, also shapes work in unintended ways. With this statement we can conclude the analysis of the CO_2 Act case and move on to the case study concerned with fiscal equalization reform in the next chapter.

Eight

Reforming Fiscal Federalism

8.1 Introduction

In 1991, the Federal Fiscal Administration (FFA) made a disturbing discovery: the disparity in fiscal capacity between rich and poor cantons had been continually increasing since 1970 (Eidgenössische Finanzverwaltung, 1991). The revelation that some cantons are better off financially than others was not itself the shocking fact, for Swiss federalism is built on a diversity that includes unequal standards of living (cf. Braun, 2003). Rather, it was the sheer extent of the disparity and the observation that inequalities continued to increase even as ever larger sums were put into a transfer system. This fiscal equalization system, dating from 1959, was originally designed to financially assist and compensate cantons facing (primarily) topographical adversity in the delivery of public services. FFA, the Conference of Cantonal Finance Directors (CCFD), and a five person panel of academic experts (Frey et al., 1994) agreed: the policy had failed and required complete redesign.

So began a reform project, the so-called *new fiscal equalization reform* (NFE). The case study presented in this chapter takes a close look at NFE's policy development process and explores the role of scientific expertise therein. This is said to have been of great significance (e.g. Braun, 2009), but has never been investigated in depth.[1] The reform as such was truly significant, for a legislative project of this magnitude and complexity had not been achieved in Switzerland during recent times. From inception to implementation, NFE's decision-making process spanned 17 years (1991–2008) and at times involved as many as a hundred policy workers

[1] Prof. René Frey – whom we'll encounter later as one of the central experts – has written on his own experience (Frey, 2012). Moreover, an earlier and preliminary version of this case study can be found in Himmelsbach (2012).

from the federal government and cantons (Wettstein, 2002). Materially, the reform involved the amendment of over 20 constitutional provisions and the rewriting of the fiscal equalization act. It also required the modification of numerous sectoral laws, at the federal as well as the cantonal level of government.

This case study covers the period from 1991 to 2004. It encompasses the design of NFE's instruments and the approval of its normative core – the constitutional amendments and fiscal equalization law – by Parliament and the people. It excludes further policy work concerned with the necessary adaptation of numerous sectoral laws and the endowment of the equalization funds established by the reform.

This chapter is structured as follows. The next section presents some background information. It elaborates on the reform's intellectual foundation of fiscal federalism (an area of political economy), before detailing the decision-making process. The chapter then moves on to explore the perspectives of the sponsors of the reform, as well as of the social democratic party, in order to analyze how they mobilized scientific expertise. A section on sites of negotiation looks at the manifestation and enrollment of expertise in parliamentary and public debate. The concluding discussion characterizes the issue and arena structure present in the NFE reform, summarizes the rationales for expertise mobilization, and looks at their effects on the decision-making process.

8.2 Background

Fiscal federalism

This case study engages with the structure of Swiss federalism and the economic theory of fiscal federalism. This section provides an overview of some key concepts for the reader unfamiliar with these issues. I have outlined the main features of Swiss federalism in an earlier chapter (section 5.2). Here I re-emphasize those features particularly relevant to this case. Firstly, the member states (cantons) have a strong standing in Swiss federalism. Any competence of the federal government requires an explicit constitutional foundation. Thus, establishing a new federal competency or reorganizing competency distribution between the federal government and the cantons often requires modification of the constitution and calls for a

mandatory referendum. This therefore turned the NFE project into a constitutional reform, as well as requiring the complete renewal of a law (cf. Braun, 2009). Secondly, Swiss federalism is decentralized (Braun, 2003) and inequality among cantons is therefore accepted. Cantons dispose of fiscal autonomy and are free to set their own tax rates, so as to be conducive to tax competition. Cantons such as Zug and Schwyz were especially successful with their fiscal policies at attracting international capital during the 1990s. The existence of a fiscal equalization system from 1959 was not designed to eradicate these differences, but to remove special burdens that come with a mountainous topography. Thirdly, Swiss federalism is cooperative, and cantons implement many federal policies (Kriesi and Trechsel, 2008: 40ff.). Cooperative federalism describes a regime in which different levels of government cooperate in the delivery of goods and services. In the Swiss case, a large number of federal policies were implemented by the cantons, which were remunerated for their services based on the cost of the latter. This provided an incentive to inflate expenses in order to maximize subsidies.

When the NFE reform was discussed in the early 1990s, Swiss federalism was suffering from several problems. There had been a creeping centralization of tasks because many cantons were too small to fulfill them. Increasing social mobility after World War II had upended fiscal equivalence: facilitated by Switzerland's small geographic size, people increasingly worked in cities, where they also consumed services and infrastructure. However, they paid their taxes in their residential canton, which might be different to their workplace location. Fiscal income and expenditure therefore no longer overlapped geographically. In the absence of horizontal compensation agreements between urban cantons and their suburban neighbors, there was a strong incentive to delegate tasks to the federal government, rather than carrying the burden alone (and the neighbors enjoying a free ride). In conjunction with cooperative federalism, this creeping centralization created a complex web of shared competencies and myriads of small federal subsidies which sought to indemnify the cantons. Finally, the wealth gap between cantons widened even as more resources were allocated for fiscal equalization.

Overcoming these problems with stronger centralization (i.e. a harmonization of cantonal tax rates in combination with stronger centralization of tasks) was never

considered a serious alternative. However, SPS – the Social Democratic Party – would later attack the NFE project with exactly such a proposition. Moreover, there was a perception that merging cantons into larger regions was bound to fail because of lack of political support. The alternative that was finally adopted drew inspiration from the economic theory of fiscal federalism (e.g. Tiebout, 1956; Oates, 1968), which, having been developed in the US, was taken up by Swiss economists as early as the 1970's (e.g. Frey, 1977). With the exception of tasks requiring substantial coordination, fiscal federalism sees member states as inherently more efficient in policy delivery, because of their greater proximity to the population they serve. This underwrites the two principles of *subsidiarity* and *fiscal equivalence*. Fiscal equivalence – that is, he who pays the piper calls the tune – postulates that public services are delivered most efficiently when the circle of beneficiaries, governors, and sponsors overlap. Subsidiarity commands that such a common denominator is to be looked for at the lowest possible levels of government.

In line with these prescriptions, the NFE reform process developed a new fiscal equalization system that separates compensation for special burdens from wealth equalization between cantons. Income equalization is jointly financed by the federal government and the cantons, with the cantonal contribution not exceeding a fixed share of the federal contribution. It aims to complement the income of the poorest cantons such that they do not fall below 85 points of the inter-cantonal mean, set at 100 points. In addition, there are two funds which compensate cantons with excessive geographical or social welfare burdens (respectively, those with mountainous terrain or a concentration of social welfare clients in urban centers). The reform further introduced a system of horizontal cooperation between cantons in order to address the spillover problem. Cantons contract with each other for service delivery and compensation, while a litigation framework discourages free-riding. In addition to these vertical and horizontal mechanisms of fiscal equalization and burden sharing, the NFE reform also aimed to eliminate inefficiencies created by task centralization and cooperative federalism. This was accomplished by eliminating joint tasks as far as was politically feasible, and by swapping the responsibility for certain policy domains according to efficiency criteria. Where joint tasks remained, the efficiency problem was to be solved with lump sum financing under a performance

agreement.[2] This means that the federal government would define the strategic objectives of a policy, provide lump sum financing, and evaluate the achievement of these objectives. In return, the cantons would enjoy operational autonomy regarding how to fulfill their obligations. Put together, these instruments eradicated many spending restrictions for the cantons and endowed them with substantially more opportunity to spend their means as they saw fit. In conjunction with a better fiscal equalization system, cantons could dispose of enough resources to more thoroughly take advantage of their constitutional autonomy. A transitory compensation fund was added to the end of the reform process but was not part of the original design. This was the necessary political grease needed to obtain the support of cantons who were less well of as a result of the system transition.

Policy process synopsis

An initial disclaimer: as a landmark decision-making process, the NFE reform has invited analysis and commentary from policymakers, observers and scholars. They have primarily sought explanations for how such a far-reaching and complex reform project ultimately met with success in the face of the numerous institutional hurdles the Swiss political system imposes on decision-making (e.g. Braun, 2009; Cappelletti et al., 2014; Freiburghaus, 2001; Larpin, 2006; Wettstein, 2002, 2010). The reform process's individual episodes are therefore well documented.

The decision-making process of NFE's first package may be divided into five episodes: problem articulation and agenda setting (1991–1994), elaboration of basic principles (1994–1996), concretization of these principle (1996–1998), tweaking (1998–2001), and ratification through Parliament and the people (2002–2004). These sequences represent an *ex post* rationalization of the process and primarily serve to orientate the reader. In practice policymakers did not anticipate the sheer length and complexity the reform endeavor would take on (Interview XXXVI).

Episode I: Cantons, we have got a problem. Fiscal equalization was a relatively low-key policy overseen by the Federal Fiscal Administration (FFA) and its cantonal counterparts (Interview XXXII). But by the summer of 1988, FFA started to become

[2]The limits of the fiscal equivalence principle in the presence of multilevel policy networks and their strong sectoral interests is the subject of a discussion between Mottu (1997a,b), Klöti (1997) and Meier (1997).

concerned about what it perceived to be a missing overall goal and lack of knowledge about the old equalization regime's effectiveness. The Conference of the Cantonal Finance Directors (CCFD) mandated FFA with an evaluation, which the latter published in 1991 (Eidgenössische Finanzverwaltung, 1991). It contained bad news: the disparity between cantons increased even as more money was flowing into the equalization scheme. Having been informed of this evaluation, CCFD started its own interpretation process of the evaluation and arrived at the conclusion that the present transfer system required a fundamental overhaul. CCFD's proposal, the so-called *Orientierungsrahmen 2000* (Finanzdirektorenkonferenz, 1992), called for three instruments: an equalization of burdens between the federal government and the cantons; an equalization of burdens between cantons of the same region; and an equalization of fiscal income. In addition, the CCFD proposal urged a paradigm shift: equalization payments should no longer be tied to the delivery of specific services. Rather, cantons should be free to spend incoming equalization payments as they saw fit. These suggestions met with approval from FFA and Federal Councillor Otto Stich, head of the Federal Department of Finance. But FFA deemed the armory of argumentation still too thinly stocked. While it did not fear a challenge to the inefficiency diagnosis of the *status quo*, it anticipated resistance from governmental agencies which inadvertently benefited from these inefficiencies and who would resist any reform. FFA reasoned that an *external* expert report would provide the necessary justification for the reform.

The expert report (Frey et al., 1994), jointly mandated and paid for by FFA and CCFD, unambiguously confirmed the need for reform. It argued that there were inefficiencies in the system because transfer payments reflected a mix of redistributive and incentive goals. Moreover, it identified a lack of regional cooperation as the main culprit in centralization of governmental tasks. It also diagnosed the lack both of a general objective and of effectiveness evaluations, too many small subsidies and spending conditions, and an excessive transfer volume. The report recommended the development of a new fiscal capacity indicator, measuring not what a canton spends but how much it could potentially earn. Based on this, the cantons should receive transfer payments as a lump sum and not as compensation for a particular service. Further, cantons should establish regional cooperation in order to offer ser-

vices they would not be able to provide on their own, rather than delegating them to the federal government. In order to increase efficiency of service delivery, the implementation of federal policy through the cantons should be remunerated under a performance agreement rather than by how much a canton spends. Finally, there was a tentative list of multi-level policies where allocating exclusive competencies to either the federal or the cantonal level of government would lead to more efficient service delivery.

Episode II: Let's make fiscal federalism more efficient. With the expert report arriving at conclusions congruent with FFA's evaluation and CCFD's reform proposal, sufficient backing had been obtained to receive the Federal Council's endorsement for starting with a legislative project. Moreover, the message could be relayed to the media – with support from the experts themselves (Meier and Spillmann, 1994) – that the existing transfer scheme had failed and required a complete overhaul. By the end of 1994, policy work started in earnest. Four working groups were initially formed, deliberating under the supervision of a managing committee. Engaging with the expert report recommendations, they started to translate the ideas into practical measures and a legislative framework (Interview XXXIV). The results were presented for public consultation in early 1996 and advertised the reform as enhancing the transparency of the relationship between the cantons and the federal government, bolstering federalism by following the subsidiary principle, and producing CHF 3 billion in efficiency gains (Eidgenössische Finanzverwaltung and Finanzdirektorenkonferenz, 1996).

Episode III: Assuring the survival of federalism. The consultation procedure revealed general support, but also produced criticism concerning the fiscal policy framing of the project, given that disentangling competencies and transferring tasks from the federal government to the cantons and *vice versa* implicated many sectoral policy domains. Not only would this affect the target publics of policy areas subject to reorganization – this was most evident with the proposal to re-assign responsibility for the special infrastructure needed by handicapped people (special schools, housing, etc.) to the cantons – but would also affect vertical policy networks between the administrations of the two levels of government, which had developed as a result of joint policy implementation. The Federal Council reacted to this criticism

by urging for a stronger *political* branding of the project. Thus, some organizational changes were introduced in the next round of policy formulation. CCFD, the cantonal partner of the project, was substituted by the Conference of Cantonal Governments (CCG) in the project's steering group, with CCFD remaining in charge of the more narrowly fiscal questions. Moreover, the number of working groups doubled in order to integrate the sectoral policies now implicated. Henceforth, three working groups continued to detail the core instruments, while five others concretized competency disentanglement in different policy domains. Their work was aggregated by the management committee, which submitted it to a newly established political steering group at ministerial level for approval. The material result of this work was once again submitted for public consultation in 1999 (Eidgenössische Finanzverwaltung and Konferenz der Kantonsregierungen, 1999).

Episode IV: Appease the opposition. As before, the second consultation procedure produced strong support but also a platform for the articulation of grievances. The social democratic party criticized the decentralization of federal competencies, especially in the social welfare domain. It considered the federal government a better steward of the welfare state's accomplishments and of social equality than the cantonal governments. Stakeholder groups in old age and handicapped care also protested the transfer of important policy programs to the authority of the cantons, fearing unequal standards of care. Other interest groups affected by the reallocation of competencies also saw their entitlements endangered. Urban communities also lobbied for a say in the reform, having been denied membership of any the project's numerous committees and working groups. Finally, the first set of model calculations of the redistributive effects of the new system produced counterintuitive results, with some cantons unexpectedly ending up worse off under the new system. Faced with these challenges, the project team went back to work to fix the transfer system and disarm the accumulating 'explosive charges' (Breitenstein, 2000) – i.e. opposition to some aspect of competence reallocation – which threatened to bring the project down at the mandatory ballot vote. While convinced that the NFE only had a chance to become reality as a unified project that contained the fiscal equalization reform *and* the redistribution of competencies, the project team nonetheless worked out some patches. It integrated the cities into the project and further per-

fected the key indicator measuring potential fiscal income of each canton (based on which the transfer payments would be calculated). This did not solve the issue that some cantons, formally beneficiaries of fiscal equalization, were now suddenly on the contributing end. A new fund for compensating these losses was therefore created in order to save the project from shipwreck. To neutralize the looming danger of small claims uniting into a broad opposition front, several policy domains were excluded from the reform. Concessions were also made to care-taking institutions by promising federal and legally binding minimum standards cantons must obey. After the project had taken this self-declared 'leap of honor' (Waber, 2000), the Federal Council at last adopted the dispatch on November 14, 2001, following earlier decisions within CCFD and CCG to endorse the project. Meanwhile, the social democratic party began to attack the proposal with a plan of its own: instead of combating inter-cantonal inequality by providing cantons with more financial autonomy and non-earmarked monetary transfers, cantonal fiscal authority should be curtailed by federally mandating a tax rate within a certain bandwidth. The party decided to launch a popular initiative based on this in order to exert pressure on the upcoming parliamentary deliberations.

Episode V: Minor tweaking of a tightly integrated and perfectly balanced proposal. Parliament assigned special importance to the NFE project by constituting a special *ad hoc* committee in both houses, rather than assigning the business to a regular standing committee.[3] Membership of the NFE committee was prestigious and the different political groups filled the allotted seats with their most reputed members, making sure that representatives from rich as well as poor cantons were adequately balanced.[4] Interviewees remembered the Council of States' NFE committee, in particular, as staffed by a mix of unusually committed and competent representatives (Interviews XXVIII, XXIX, XXXI, XXXII, and XXXVI). Moreover, these representatives had the full trust of their respective parliamentary groups, which ensured that the floor debate barely differed from decisions taken inside the subcommittees (Interview XXIX). Deliberating first, the Council of States introduced subtle changes, dutifully adhering to the mantra that the NFE is a single reform with mutually rein-

[3] All three NFE dispatches, only the first of which is discussed here, were deliberated in such an *ad hoc* committee.

[4] The NFE committees of both houses convened for nine, at times multi-day meetings.

forcing pillars. The package had to be handled with kid gloves, it was argued, lest its effectiveness and the underlying compromise between the cantons and the federal government shatter to pieces. While the Council of States took this to heart, deliberation in the National Council was more conflictual, as the social democrats were comparatively stronger than in the upper house. They led a well-prepared and organized attack, particularly against the decentralization of some social policies under NFE. On October 3, 2003, both houses accepted the new fiscal equalization law, as well as the constitutional amendments.[5] But the struggle was not yet over. The constitutional amendments required popular consent in a mandatory referendum vote. Preparations to win the population's hearts and minds for the project had been long in the making. While the NFE project has been operating with a strategic information management concept since at least the first consultation procedure, work on the referendum campaign started in August 2000. Finally, all but three Cantons and 64.4 percent of the voting public accepted the reform on November 27, 2004.

8.3 Perspectives

For the first NFE reform package (which constitutes this case study's empirical site), several collective actors contributed to the mobilization of scientific expertise. The project organization, the Social Democratic Party (SPS), and the fiscal administration of the canton Zug mandated expert reports. The project organization mandated the lion's share of expertise, while Zug and SPS only did so once. In the following discussion, I analyze these instances of expert mobilization by relating them to the commitments the mandating actors defended in the policy arena. The discussion of Zug is integrated into the illustration of the project organization's expertise mobilization, as the two are intimately linked. But before doing so, a tabular overview details the instances of expertise analyzed by this research.

[5]The Council of States approved the law and the constitutional amendments with 38 to 2 votes. The National Council voted 126:54 in favor of the constitutional amendements and 121:52 in favor of the equalization law.

Expertise synopsis

Table 8.1: Expert reports within the context of the NFE reform

Producer	Issue	Communication	Principal	Publics
Frey et al. (1994)	Causes of policy failure and reform concepts	Report; in person; press conference; press article by authors	FFA & CCFD	Stakeholders
Jeanrenaud and Blöchliger (2000)*	Alternatives for remuneration of joint federal/cantonal policy implementation	Report; meeting with working group	Project organization	Project organization
Biaggini (2000)	Legal aspects of joint policy implementation under performance agreement	Report; meeting with working group	Project organization	Project organization
Fischer (2001b,a)	Concretization of the cantonal fiscal resource index	Report; meeting with working group and CCFD plenary	Project organization	working group 'resource index'; CCFD
Zimmerli (2001)†	Propositions for intercantonal conflict litigation	Report	Project organization	CCG
Inderbitzin (2001)‡	Assessment of topographic burden equalization	n/a	n/a	n/a
Frey and Schaltegger (2001b)	NFE goal and effectiveness assessment	Report; Press article	FFA & CCG	CCG & FFA
Blöchliger, Staehelin & Partner (2001)¶	Impact of NFE on canton Zug	n/a	Fiscal administration Zug	NFE decision-makers
Kirchgässner and Hauser (2001)	Assessment of risk of tax payers moving abroad due to the NFE	Report; hearing by CCFD and by Parliament; TV debate (Arena)	Project organization	Zug; Public
Informal expert contacts	Concerns of working groups	Personal communication	Working groups	Working groups

Notes:
*Commissioned in 1997; comprised the development of funding principles (part I) and their application to the different policy domains under joint cantonal/federal implementation (part II).
†No copy obtained; only known from citations and interview testimony.
‡Listed in the dispatch (Schweizerischer Bundesrat, 2001); no further information could be obtained.
¶No copy obtained; only known from citation.

The NFE reform process occasioned a long list of mandated expert reports. Table 8.1 provides a summary.[6] These reports are of three kinds: analysis of the entire fiscal equalization system; reports making suggestions about specific policy instruments; and economic impact assessments. While the first and third types have been publicly discussed, the more sectoral reports largely remained within the realm of the project working groups. In addition to these formal reports there were numerous informal contacts between project working groups and external experts. Some are documented in archival records, others have been conveyed through interview testimony. They ranged from simple phone conversations to short written statements.

With the exception of one report, all expert opinions were solicited by the project organization, with FFA *and* CCFD (later, CCG) as mandating and financing principals. The exception is canton Zug, which commissioned its own NFE impact assessment. A report commissioned by the social democratic party is also not listed here. This concerned the alternative idea of reducing fiscal inequalities between cantons by limiting the range of admissible tax rates. It had no direct formal connection to the NFE decision-making process *per se*, as it was geared at arguing against fiscal competition between cantons, but I will discuss this alternative proposition later in the chapter.

Reform sponsors

The NFE reform affected the whole of the federal government, 26 cantons, and the urban centers. It was primarily driven by two organizations: FFA and CCFD. In what follows, I characterize the organization of this project and elaborate how social coordination in pursuit of a single commitment was possible. Against this backdrop I then elaborate three stages of expert mobilization: ensuring the credibility of the reform commitment, supporting policy work, and substantiating the message that the reform only produced winners.

[6] Most reports have been listed in the dispatch (Schweizerischer Bundesrat, 2001: 2550–1).

Organization

The 'project organization' is an umbrella term for a complex collective action best likened to an *ad hoc* multi-level executive branch of government with cantonal, inter-cantonal,[7] and federal elements. Figure 8.1 depicts the project organization, including its evolution between 1994 and 2001. It was composed of several technical working groups, whose work was overseen by an administrative-political managing committee, which reported at first to the Federal Council and later to a political steering committee. Each level (except the Federal Council) was staffed with an equal number of delegates from the executive branch of the respective federal and cantonal governments.

The origin of this organization of multi-level policy-making is the result of earlier joint reform projects between the cantons and the federal government. There had been past attempts to disentangle multilevel policy domains that resulted in two modest reform proposals, which were adopted during the 1980s (cf. Freiburghaus, 2001). For that purpose, the Federal Council, in 1978, established a 'liaison committee' between the federal government and the cantons (Freiburghaus, 2001: 12). This approach to organizing projects of institutional reform was different from earlier models of technocratic expert committees, and took into account the potentially diverging interests of the cantons and federal government. This new mode of organizing multilevel cooperation became more widely adopted. In addition to the NFE reform, it also underpinned the constitutional overhaul[8] that started at the same time as the NFE project, in 1994.[9]

Over time, the organization took on a significantly larger size and degree of complexity than initially planned. This was caused by the increasing implication of sectoral policies in addition to the fiscal policy core of the reform. The necessity of a more cross-sectoral and integrative approach became evident in the first

[7] Inter-cantonal coordination in Switzerland is described in Bolleyer (2010: Chap. 4).

[8] The constitution's overhaul (i.e. recasting its meaning and intent in a more comprehensive and structured form) also provided an opportunity for coordination between the two projects. The conference of cantonal governments established a legal advisory council for this project and later suggested integrating two of its members (professors Ruch and Schweizer) into NFE working groups.

[9] The Federal Office of Justice (FOJ) was the leading agency on behalf of the federal government (Mader, 2008), and was also implicated in the NFE project. It discussed the project organization with the Federal Fiscal Administration (Interview XXXVI) and several of its high-ranking members participated in different working groups throughout the NFE reform.

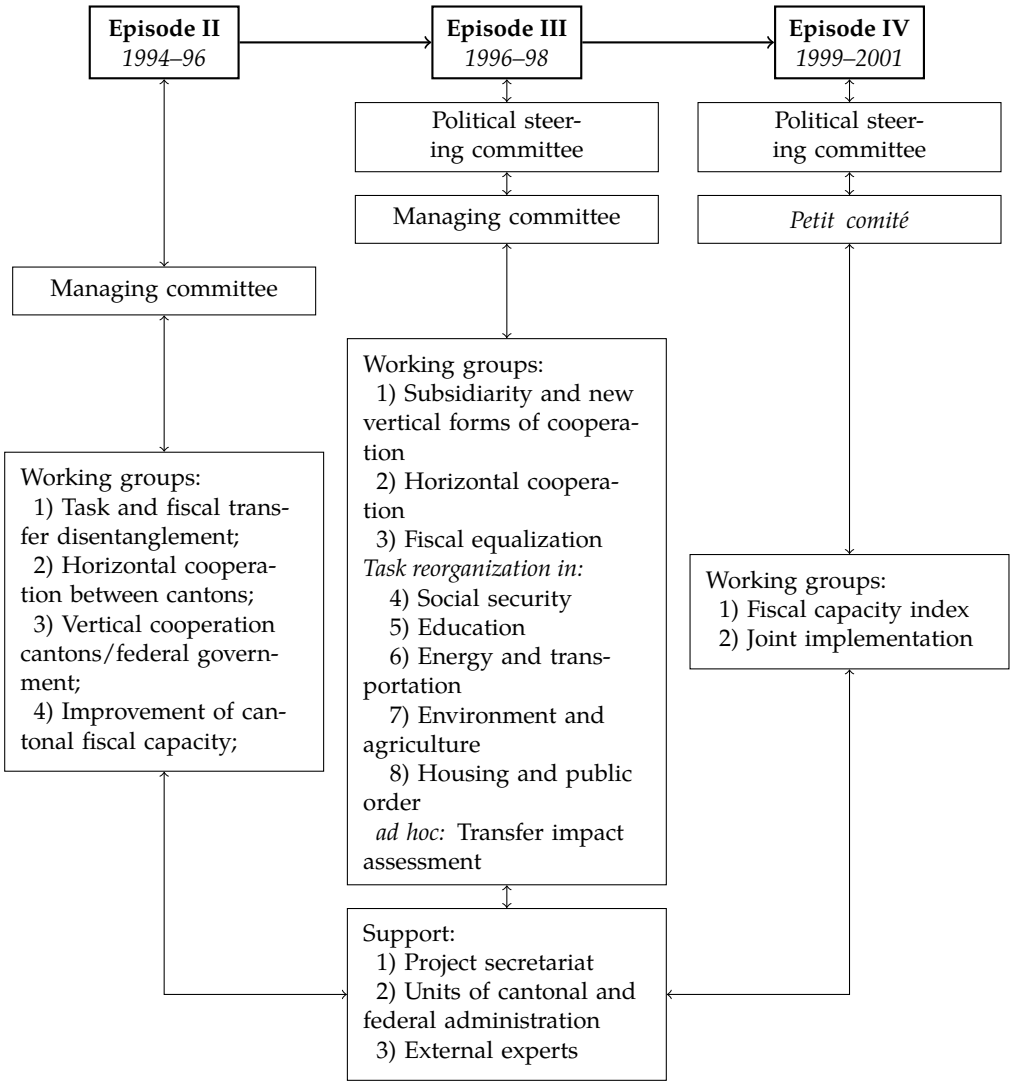

Figure 8.1: The NFE project organization. *Source:* author's illustration, based on Eidgenössische Finanzverwaltung and Finanzdirektorenkonferenz 1996: Annexe 1 and Eidgenössische Finanzverwaltung and Konferenz der Kantonsregierungen 1999: 53.

consultation procedure (Eidgenössische Finanzverwaltung, 1996).[10]

Despite its scale and complexity, and with the exception of symmetrical participation,[11] the project organization retained many elements found in the other case studies, particularly with regard to the hierarchical layering. The political steering

[10]The *petit comité*, replacing the managing committee as a sleeker structure, also contained a representative of the cities' association.

[11]As the stem cell research regulation and the CO_2 emission reduction case studies demonstrate, to what extent different branches of the administration cooperate in policy formulation varies significantly between issues. Yet, all agencies are ultimately accountable to the Federal Council, which speaks with one voice.

committee can be likened to the Federal Council's role in a normal decision-making process, for the latter did not articulate an official political opinion until signing off the dispatch (Wettstein, 2010: 349). As will become evident, the basic organization of expertise mobilization was also comparable to these other cases, as experts were not members of working groups and had no decision-making authority. However, they collaborated very closely with the working groups.

This organization of policy work had some interesting affordances. The hierarchical organization and horizontal division of labor in the working groups effectively regulated conflict. For instance, federal and cantonal delegates participating in the project did not always agree on issues such as joint policy implementation by contract. But they were bound to loyalty by a political mandate that left no exit option (Interview XXXVI). After all, individuals participated in working groups as *public* and not as private actors. This set the working groups apart from an *ad hoc* expert committee, an instrument that past experience had demonstrated to be hard to handle in the context of dissent (Wettstein 2002; section 7.3 in this study). Further, symmetrical participation created a system of double affiliation, with project participants defending the project's aims and methods before their original constituency (i.e. the federal administration or cantonal governments) while advocating the interests of that constituency within the project (Interview XXXVII). Finally, when comparing the reform pillars suggested by Frey et al. (1994) with the thematic organization of the working groups, it becomes apparent that the different instruments (vertical cooperation, horizontal cooperation, fiscal equalization) were always worked on by distinct groups. This was certainly productive of the astonishing coherence between 1994 and 2001.

Commitments

The characteristics of this project organization circumscribes the limits of the social world it constituted, yet these formal elements say little about the commitment that brought into being and perpetuated this organization. The seed of this commitment consisted of CCFD and FFA's shared perspective that the old system was broken beyond repair and that a new system should strengthen the cantons as providers of key public services, because this was more economically efficient. This seed would

eventually grow into the publicly defended and compelling conviction that the survival of federalism as a core institution of the Swiss state depended on the NFE reform. On the conceptual level, this commitment was nourished by the two principles of *fiscal equivalence* and *subsidiarity* that are at the core of the theory of fiscal federalism (cf. section 8.2).

Several interviewees (XXXI-XXXIV, XXXVII) agree that the reform's transmission through seven years of policy formulation (involving one of the most complex processes Switzerland has ever seen), intense scrutiny in Parliament (involving a dedicated *ad hoc* committee), and a referendum campaign was ensured by the sustained involvement of a few individuals with great conviction. Some of these involvement trajectories were deliberately enabled, others were more spurious. While the reform project was initiated under the auspices of Federal Councillor Otto Stich, it was Kaspar Villiger, his 1995 successor to the helm of the Federal Department of Finance, who became an ardent champion of the project, even beyond his retirement at the end of 2003 (cf. Merki, 2004). He oversaw the most politically delicate episodes of the decision-making process, including deliberations in Parliament where he defended the project.[12] Hanz-Rudolf Merz, his successor, led the referendum campaign and the remaining policy adaptation work.

There was similar personal continuity at the head of FFA, which hosted and coordinated the entire project. FFA was headed by Ulrich Gygi until mid–2000, after which former deputy director Peter Siegenthaler succeeded him. This ensured a seamless transition, not only because both strongly supported the project, but also because Siegenthaler had been a member of various project committees since their inception in 1994. It was Siegenthaler who, during committee deliberation in Parliament, acted as the most authoritative expert on most aspects of the reform.

On the cantonal side, Peter Schönenberg, finance director of the canton St. Gallen, and his colleague Franz Marty of canton Schwyz (both were CCFD presidents at some point during the reform), sported strong support for the project's objective and instruments. Marty not only presided over a working group but was a member of the managing committee. Schönenberger followed a similar career. In addition,

[12] Villiger's commitment to federalism is captured in his book "Eine Willensnation muss wollen" (Villiger, 2009).

Schönenberger also became CCG president, and was named CCG delegate for the NFE reform after his tenure in order to ensure institutional backing for his continued involvement in the project. Hans Lauri was a somewhat maverick figure. While deputy director at FFA, he was in charge of the old fiscal equalization scheme for some time. After leaving the federal administration, he became cantonal finance director in the canton of Bern, where he oversaw an intra-cantonal fiscal equalization reform. He also assumed CCFD presidency at a crucial stage of the project and was member of the *petit comité* created to 'tweak' the project after the second consultation procedure. Finally, he was elected Councillor of States and became member of the NFE *ad hoc* committee.

These individuals created a momentum that sustained the project through its more difficult times. This momentum was conducive to bestowing the finalized proposal with an aura of greatness and untouchability. To underline the reform's importance for Switzerland's political institutions, officials were not shy to make use of sweeping terminology, such as calling NFE a 'once-in-a-century reform project' (Associated Press, 1996) or likening it to 'oxygen for the cantons' (Mettler, 2004). Interviewees XXI, XXXII, and XLII also recall that the project team's conviction proved contagious for MPs (though less so for the social democrats…) who felt they were contributing to a reform of historic proportions.[13] These electrified MPs, together with cantonal members of the NFE project team, became the most important pro-NFE ambassadors during the referendum campaign.

In need of an impartial voice

Mobilization of scientific expertise was intimately linked to the commitment of FFA and CCFD to reform fiscal equalization, especially with regard to the unintelligible web of subsidies that had accumulated since 1959. The first expert report (cf. Frey et al., 1994) was mandated in early 1994, when FFA and CCFD had already concluded that reform was inevitable and had finished sketching out their (congruent) ideas in terms of scope and general direction. The idea for such an expert report grew out of FFA's concern with its political credibility as a sponsor of reform.

[13]With hindsight, once-upon-a-time enthusiastic interviewees talked about the reform with a much more cautionary note during our conversation.

An internal memo reasoned that FFA was an interested party in such a reform, and would not be able to push a reform agenda which would potentially lead to the elimination of public sector jobs in other policy areas. Simultaneously, FFA preferred a small cantonal/federal project team operating from within the bureaucracy in order to maintain the coherence and focus of the reform agenda. It thus proposed the joint mandating of an expert report to CCFD, which, to sustain political pressure, could be published if necessary. With CCFD accepting FFA's proposition, mandating this expert report became the first act of this joint venture. In order to draw the maximum political benefit from the expert report, FFA informed the Federal Council of plans for it. Once the report was released, it was first presented to the Federal Council (26.4.1994), the next day to the wider federal administration, and finally to a press conference in the presence of the experts themselves. A month later, two members of the expert team also published a newspaper article (Meier and Spillmann, 1994). In subsequent policy documents – such as intermediary reports and the dispatch – as well as in press coverage the expert report was persistently framed as the confirmation of the need to reform fiscal equalization. FFA's 1991 evaluation and CCFD's *Orientierungsrahmen* also tended to be mentioned at the same time.

Despite this carefully staged performance, the expert report was far from being a performative artifact. Archival documents show that FFA recruited broadly, contacting almost every professor in Switzerland with a suitable specialization. About two thirds of the contacted professors were available and recruited for the task. They were Prof. René L. Frey and his collaborator Andreas Spillmann (University of Basel), Prof. Bernard Dafflon (University of Fribourg), Prof. Claude Jeanrenaud (University of Neuchâtel), and Prof. Alfred Meier (University of St. Gallen). While having had knowledge of the evaluation and reform proposal preceding their own work, the experts were oblivious to the political role their report was supposed to play; indeed, at a dinner to celebrate the finalization of their report they joked that their work was destined for the infamous drawer of the bureaucratic filing cabinet. Moreover, despite the political motive, the perceived problem pressure was such that FFA was genuinely interested in the experts' recommendations. This is also asserted through Interviewee XXXVI's report that working groups during episode II extensively engaged with the report.

Supporting policy work

Policy work during the entire elaboration of the project (episodes II–IV) was organized as a two-way information flow. The managing committee assigned a task list and schedule to each working group, which was to organize as it pleased and to ask for external expertise if required. The working groups divided up the work among its members, constituted subcommittees where needed, and met regularly to deliberate.[14] Each delivered intermediary reports to the managing committee, which sent back feedback and made sure the project did not deviate from the predefined mandate. The managing committee circulated propositions further up the ladder to be approved by the political principal, first the Federal Council (episode II), later the political steering committee (episodes III and IV). The working groups documented their propositions in intermediary and final reports, which formed the foundation for the public reports released after episodes II (Eidgenössische Finanzverwaltung and Finanzdirektorenkonferenz, 1996), III (Eidgenössische Finanzverwaltung and Konferenz der Kantonsregierungen, 1999) and IV (i.e. the dispatch, Schweizerischer Bundesrat 2001). The authoring process of the dispatch was in particular a process of intense negotiation between the federal and cantonal delegates, Interviewee XXXIV recalls. There is no evidence that external experts were formally consulted during episode II of policy formulation.[15] However, experts became somewhat more involved during episode III. This concerned the three issues of new forms of cooperative federalism, the development of an index measuring fiscal resources available to each canton, and litigation procedures concerning inter-cantonal contracts.[16]

The disentanglement of competencies and the search for forms of joint policy implementation which would respect an efficiency criteria absorbed much of NFE's project resources. The 1994 expert report (Frey et al., 1994) had already provided a tentative list, with policies best allocated either to the federal government or cantons according to the subsidiarity and fiscal equivalence principle. A working group

[14]Interviewee XXXVI describes these group meetings as always productive and cooperative, despite hard negotiations between different perspectives and interests.

[15]This does not preclude informal exchange. I have been repeatedly told that Switzerland is a small country, where information is easily obtained informally (e.g. Interview VI, XXI, and XXXIII).

[16]The latter led to a report by Zimmerli (2001) and ultimately concerned inter-cantonal policy-making. For lack of data on its elaboration, I forgo discussion.

during episode II further developed this list (Eidgenössische Finanzverwaltung and Finanzdirektorenkonferenz, 1996). The translation work for these suggestions took place between 1996 and 2001, when five different working groups wrestled with the task. While separating competencies was politically challenging, developing new instruments for joint implementation engendered numerous technical questions. In that context, Prof. Jeanrenaud and Andreas Spillmann, both members of the 1994 expert team, were commissioned in 1997 to develop an assessment tool that would allow the adequacy of lump sum financing of joint policy implementation to be judged for different policy areas. This tool was then to be demonstrated using a concrete case from each of the five working groups dealing with task disentanglement (BAR E4114A 2004/75 BD 376/1).

In addition to this decision tool, there were legal questions about performance agreements between public entities. Customarily, joint implementation had followed a one-size-fits-all approach in which federal law and ordinances would specify the same implementation modalities for all cantons (Interview XXXVI). Performance agreements, however, would introduce case-specific contracts between a branch of the federal administration and a given canton. Concerned about how the cantons would fare under this new regime, and in order to ensure coordination with the ongoing reform of the constitution, CCG petitioned the project organization to include two of 'their' experts (Interview VII). These experts, professors of law Rainer J. Schweizer (who also played a central role in the stem cell research case) and Alexander Ruch, were members of CCG's working group on the constitutional reform. While not formally members, Schweizer and Ruch assisted working group 1 (vertical cooperation) and 2 (horizontal cooperation), respectively, during episode III. In that context, Prof. Schweizer elaborated a commentary on the constitutional compatibility of performance agreements (BAR E4114A 2004/75 BD 376).[17] Finally, during episode IV (1999–2001), a new working group was formed to develop a legal template for such a performance agreement. As Interviewee XXX recalls, the group quickly realized the need for expert assistance. It mandated Giovanni Biaggini, professor of law at the University of Zurich, with the task.

[17]Meeting minutes show that Ruch participated in meetings, but limited archival access did not allow me to establish his exact role and contribution.

The elaboration of the cantonal fiscal resource index was another area where an external expert became involved. It was during episode IV that a special working group was created to concretize such an indicator. By 1994 the expert report had already discredited the existing 'fiscal capacity index' as inadequate to compute how much a canton should contribute or receive as part of fiscal equalization, on the grounds that it mixed elements measuring burdens (e.g. mountainous topography) with those measuring costs (how much was spent on policy). A new indicator, the expert report argued, should measure the potentially taxable value private individuals and corporations created in a canton (income, fortune, natural resources, etc.). The qualifier 'potential' is important, for the index should not measure how much of that value a canton actually captures through taxation. As such, the index would not set incentives for a particular fiscal policy. This valuation should also be separated from the quantification of burdens, which should be compensated separately. Hence, it would be imaginable that a canton could be simultaneously rich, thus contributing to fiscal equalization, while suffering from heavy burdens, for which it would be compensated. The concretization of such an index was tricky, as it had to accurately capture the wealth of 26 very different cantons and be perceived as unbiased by those cantons. Different concepts, such as the cantonal gross domestic product, were evaluated and discarded as too complex. It was ultimately FFA's internal economic advisory council that came up with the idea of basing such an indicator on the same assessment methodology as used to determine federal taxes. This was a relatively simple and unbiased system, but did not capture fortunes and other values not subject to federal taxes (Interview XXVIII).

At this point the project organization sought the help of *Crédit Suisse's* economic consulting division, one of the few specialists in regional economy. Its collaborator Roland Fischer executed the mandate and delivered several reports (Fischer, 2001b,a). Fischer closely collaborated with a dedicated working group established after the 1999 consultation procedure, and also presented his results at a CCFD plenary session. FFA hired him just before the beginning of the deliberation in Parliament, where he assisted committee deliberation as a representative of the federal administration and explained the mathematically complex indicator directly to MPs (Interview XXVIII). Interviewee XXXVII recalls Fischer's work as important for the

concretization of the fiscal equalization mechanism. He also describes the leap of faith required of politicians to embrace the formula (it contained an α and a β that mystified MPs).

This, then, encompasses the bulk of work done by external experts within the framework of the working groups. Some instances certainly eluded the data collected in this study. However, there is no indication that any such undocumented instances would have followed a radically different pattern. This pattern can be characterized as follows: external experts, whether delivering formal reports or in-person counseling, closely interacted with the working groups and presented their work in inter-cantonal fora such as CCFD. But they had no public profile. Their work was not discussed in the media, and even the dispatch contains only an incomplete inventory of their involvement.

Taming redistributive politics

The final episode of policy work (IV) resulted in three distinct expert reports. Amid mounting opposition, the project organization asked Prof. Frey in February 2001 to evaluate the results of policy work thus far, in terms of its compatibility with the reform recommendations contained in the 1994 report (Frey and Schaltegger, 2001b). At the same time, Zug, the canton with the highest projected per capita contributions to the equalization fund under the future NFE regime, was battling the level of its future contributions. It enlisted the expertise of the consulting firm B,S,S, (Blöchliger, Staehelin & Partner, 2001) to bolster its argument that the NFE would force it to increase taxes substantially, which would lead to the exodus of the foreign companies and high net worth individuals it had become expert at attracting through very low taxes. The result, it argued, would be a loss in fiscal revenue for Zug and the federal government (cf. Merki, 2001). To counter this challenge, the project organization enlisted the professors Kirchgässner and Hauser (University of St. Gallen), who, within one month, had to empirically assess Zug's claim (Kirchgässner and Hauser, 2001).

These instances of expert mobilization share a common background. As the reform took shape, the cantons became eager to know how they would fare under the new system. They exerted increasing pressure until the project organization

gave in and quantified the fiscal consequences of the entire reform project (Interview XXXIV). The project organization opposed this undertaking because it would invariably draw the focus away from the benefits of the new system as a whole, reducing the political struggle to its redistributive consequences. Further, such a quantification could only provide limited insight given that much of the required data had not yet been collected, forcing the use of simulations. The results of these computations showed a group of unexpected 'losers': poor cantons that would further suffer from the reform (Waber, 2000). This constituted a political roadblock, whose elimination was imperative for the project's success in Parliament. A solution was ultimately devised in form of a compensation fund that would indemnify these cantons (Fontana, 2001). At the same time, the beginning of parliamentary deliberations came within plausible reach and things got 'hot', to use Interviewee XXXIV's language. Amid this opposition, some leading supporters of the project began themselves to have doubts (Interviews XXXII and XXXIII). At this point (Jan. 2001), Frey received a call from FFA, asking him to assess the project's merit and coherence. Frey and his collaborator submitted their final report in May, and after a large majority of cantons approved the NFE for parliamentary debate on June 21, Frey et al. published their findings in a newspaper article (Frey and Schaltegger, 2001a).

In the report, Frey and Schaltegger (2001b) reiterated the foundational principles of fiscal federalism. They assessed the NFE reform project as in line with these principles and with the original concept proposed by Frey et al. (1994). Pointing only to a few minor flaws, they forcefully argued for the reform's completion. The compensation fund, as well as the bracketing out of some policy areas from the reform, were, they argued, a price worth paying for political support, as they would not fundamentally disturb the reform's underlying concept. It was exactly this concept – disentanglement of competencies, new forms of horizontal and vertical cooperation based on contracts, the compensation of special burdens, and the equalization of fiscal resources – that would empower the cantons to be autonomous, capable, and sustainable political entities during the decades to come. This and only this would reverse the trend of cantons turning into mere implementers of federal policy amid their fiscal incapacity to live up to their constitutional autonomy. When

assessing the reform's effects, cantons should have these benefits in mind, the authors contended, and not the immediate redistributive consequences. The report was a relief to the project (Interview XXXIII). It also established the argument of 'looking at the NFE system as a whole and not at the bottom line of the balance sheet' in order to gauge its benefits, which the project organization repeated like a mantra during committee deliberation in Parliament. It also used it to underline the 'win win' nature of the project in public (e.g. Waber, 2001; Siegenthaler and Wettstein, 2001).

Zug's grievance regarding getting little direct benefit from the NFE reform, while having to pay substantially more, was not addressed by the project, and Parliament also refused to cap the contribution by an individual canton. Interviewee XXXIV reports that Zug, in reaction to Frey's advisory opinion, sought its own (cf. Blöchliger, Staehelin & Partner, 2001) to demonstrate that the NFE would lead to a loss of fiscal income that would also affect the federal government. Frey and Schaltegger (2001b: 19) had hinted at this possibility, pending empirical investigation, because too much redistribution would force Zug – a tax haven by international standards and the highest per capita contributor to the NFE – to increase taxes, thus becoming less attractive in the international tax competition. Yet their report does qualify this possibility as having the potential to seriously undermine the project's benefits.

Nevertheless, spring 2001 was not an ideal moment for the project organization to see their 'win win' argument attacked, given the upcoming votes within CCG and CCFD. This was when Kirchgässner and Hauser were mandated to empirically assess Zug's claims. This report was very important for the project organization in order to defend its credibility in front of CCFD. Kirchgässner and Hauser (2001) delivered a clear message: Zug will clearly lose from the NFE reform, but not Switzerland as a whole, for its position in the global tax competition was second to none. Their report also disqualified Zug's own interpretation of Blöchliger, Staehelin & Partner (2001), which was an inadmissible exaggeration in their eyes. As discussed later, Kirchgässner was the only external academic expert Parliament invited to a hearing. He was also the only such expert to appeared in the 'Arena' TV debate preceding the ballot vote in November, 2004.

The Social Democratic Party

Of all the major political parties, the social democrats (SPS) were the only ones to formulate a critical stance toward the NFE reform project. It was not the problem diagnosis of growing inter-cantonal disparities that SPS disputed – quite to the contrary, in fact – but the proposed cure. This emphasized federalism, which, according to SPS, was conducive to creating inequalities. Consequently, the remedy was more, rather than less, centralization. It was only through federal policy that such important institutions as the state pension scheme (AHV) and incapacity insurance (IV) became possible, it was argued. Still worse was the tax competition between cantons, which was construed as further exacerbating the inter-cantonal wealth gap, leading to people of an equal income paying several times more tax in the poorest than in the richest canton. NFE was anathema to the SPS leadership because, if enacted, it would encourage more tax competition, rather than less. It would further transfer collective benefits from the federally run incapacity insurance to the cantons. Collective benefits are public grants to institutions taking care of handicapped people (i.e. fixed costs of building a school for special needs children), and to collectively used services of this target group (i.e. dedicated transportation services). There were strong doubts as to whether the cantons were willing and capable of providing the previous level of care.

The party had already begun to articulate the position that a more effective fiscal equalization system was desirable, but should be coupled with more rather than less centralization, during the first consultation procedure in 1996 (cf. Eidgenössische Finanzverwaltung, 1996). By the second consultation procedure in 1999, it started to claim that the reform should be tied to national tax rate harmonization, for which it launched a failed attempt with a parliamentary initiative (Associated Press, 1999; Schlumpf, 1999). SPS's parliamentary group further articulated its position in a retreat held in early 2000 (Schweizerische Depeschenagentur, 2000). Then, in a July 24, 2001 press conference, it announced its plan to fight for tax harmonization by means of a popular initiative, should its claims not be integrated into the NFE project. It was at this press conference that the party presented a study it commissioned from Prof. Hans Schmid of the University of St. Gallen. Schmid, a

former National Councillor for SPS (1972–1985), saw merit in NFE's fiscal equalization related instruments and was of the opinion that this system would effectively reduce the differences between cantonal tax levels. He consequently encouraged his party to contribute proactively to the NFE deliberation in Parliament, reserving a popular initiative as a backup plan only (Rosenberg, 2001). Concretely, he suggested complementing the NFE equalization mechanism with a bracket model that would mandate cantons to set their tax rates within +/- 20 percent of a rate to be defined by the federal government (Stalder, 2003). The party effectively prepared such a backup initiative and its delegate assembly authorized the party secretariat to launch it after the NFE ballot vote, if deemed necessary (Mettler, 2002).

In contrast to the public performance of SPS's popular initiative as a political threat, the preparation of NFE's deliberation in Parliament by the SPS parliamentary group followed a more habitual pattern, without the involvement of external experts (Interview XXIX). Judging by committee deliberation in Parliament, even Schmid's report was secondary and was only briefly referred to on one occasion, as meeting minutes show.[18] The term 'habitual' refers especially to the analytical resources available. Such resources consisted of retreats or seminars where members of cantonal governments, as well as members of the NFE project organization[19] of the same party, were invited to elaborate on the project. Such events were also organized by the other major parties, which arrived at opinion formation in a similar manner (Interviews XXXI, XXXVII, and XXXVIII). However, the preparation process within SPS differed in terms of intensity, compared to SPS's preparation of regular legislative business as well as to the process in other parties. The SPS parliamentary group set up a relatively elaborate division of labor, in which group members prepared individual issues according to their competencies and political specializations. This was an unusually refined process due to NFE's implication of many sectoral policy domains (Interviews XXIX and XLII). It also demanded a substantial time commitment, with some of the party's opinion leaders writing position papers during the summer holidays (Interviews XXIX). This led to effective

[18]The bracket or bandwidth model lost even support within SPS as it would have forced some cantons to raise taxes on low revenues. According to Interviewee XXIX, further pursuit of this alternative would have been political suicide.

[19]NFE's political steering committee actively encouraged such outreach activities by project participants (Interview XXXVII).

teamwork, which included academics such as Jost Gross (lecturer in law, University of St. Gallen) and Stéphane Rossini (professor of social policy, University of Geneva and HES-SO), and came to fruition during deliberation in the National Council's *ad hoc* NFE committee. While it was the same MPs who represented their political group during all committee meetings, SPS representatives adopted a relay system in which they substituted their regular members with whoever was most competent in the issue being discussed during a particular meeting.

In conclusion, it can be maintained that SPS did not really deploy different analytical resources for the preparation of NFE deliberation than other parties did. However, it deployed them in a very organized manner, and dedicated much of its personal resources.[20]

8.4 Sites of negotiation

The NFE reform is a peculiar case regarding the position of scientific expertise. The latter served as much as a substantial input for policy formulation as it did a cohesion function for the reform coalition. In that regard, expertise mobilization by the reform sponsors was a reflexive act, which sought to strengthen the coalition and not to convince coalition outsiders. Therefore, experts did not only interact with project committees, one venue of the coalition, but also with CCFD and CCG. While this has emerged from the discussion of the reform sponsors' perspective, Parliament and the public sphere constitute two additional venues where expertise made an appearance. I discuss Parliament and the public sphere below. But before doing so it is important to keep in mind that, unlike in other decision-making processes, the NFE project organization involved most of the stakeholders (although not the handicapped associations). Further, the certain knowledge that the reform touched upon everybody in Switzerland and had to pass a *mandatory* referendum made public communication a strategic imperative. Therefore, there was less of a boundary clearly delineating a policy arena from the general public. Put differ-

[20]Despite this high level of engagement, it should not be forgotten that SPS as a party – in contrast to its parliamentary group – was not speaking with one voice. Especially cantonal representatives did not share the expressed doubt that the cantons would be less capable at implementing social policy that the federal government. Moreover, some central individuals in the NFE project organization were also SPS members (e.g. FFA director Gigy and his successor Siegenthaler).

ently, the project was its own arena and communicated with the public at large. This shaped the background of negotiations and transactions involving scientific expertise outside the project arena.

Parliament

By all accounts, the parliamentary process was extraordinary. Not only was there a special *ad hoc* committee for the task, committee members were also very invested in the process and had no interest in sabotaging swift deliberation (Interviews XXXII and XLII). Given the quantity of new or amended norms to be deliberated – a new law and some 20 constitutional articles – the process was also very time consuming, with the committee of each house holding nine meetings, each of which sometimes stretched over more than a single day. This enabled a rather swift floor debate, with the Council of States dedicating only two days to the business.

Both NFE committees held hearings, but they almost exclusively served the purpose of giving concerned stakeholders – the cantons, the communities, and care providers for the handicapped and elderly – the feeling that Parliament acknowledges and takes serious their points of views and grievances. For instance, the NFE committee of the Council of States (NFE-CS) openly discussed 'referendum strategy' when deciding whom to invite. Moreover, while civil servants supplied an exhaustive list of suggestions of hearing participants (such as professors Frey and Zimmerli), NFE-CS was not interested in hearing them independently of questions that deliberation might open up. Although the 'scientific' foundation of the reform concept was underlined repeatedly, deliberation was framed as engaging with practical and not 'academic' business. One exception was Prof. Kirchgässner, who was heard by NFE-CS on NFE's consequences on tax rates in places like Zug. He was invited, together with the finance department director from canton Basel (also an academic by background), because a committee member suggested inviting the CEO of an international holding group that moved its headquarters to Switzerland, as well as a representative from *economiesuisse*. The hearing itself was insubstantial and short as the four did not fundamentally disagree. This hearing is a nice illustration of positional symmetry with regard to hearing participants, which many interviewees describe as standard practice: committees do not expect to get impar-

tial testimony in a hearing (experts also have values they contend), so they invite a representative of each major position, and then triangulate such testimony with their own beliefs. Thus, a professor's opinion is not inherently superior to that of an interest group representative within a hearing.

In contrast to these hearings, expert support provided by the federal administration was essential to committee deliberation. As is customary with all business the Federal Council presents to Parliament for approval, committee deliberation takes place in the presence of the Federal Councillor in charge (Kaspar Villiger) and of the director of the agency unit that has drafted the proposal (Peter Siegenthaler, FFA), who is joined by a small staff (Gérard Wettstein and the newly hired Roland Fischer). This delegation was completed with the unusual presence of CCFD secretary Kurt Stalder and CCG staff member Walter Moser. Depending on the discussed provision, staff from other branches of the federal administration were invited to provide their expertise. This was notably the case for FOJ deputy director Luzius Mader, one of the administration's most accomplished constitutional experts, who played a leading role in the NFE as well as in the constitutional reform. Together, this team provided in-depth explanation and counsel to deliberating MPs. They also authored substantive written responses to questions or alternative scenarios suggested by MPs. The sheer number of these reports – approximately eight reports, each measuring up to 40 pages, were produced for NFE-CS, and five for its sister committee in the National Council (NFE-NC) – may be readily explained by the project's large scope. Such reports do not always contain new information, and their compilation is sometimes perceived as redundant by the administration (Interview XXXVI). Yet Interviewees XXIX, XXXII, XXXV, and XLII share the view that they addressed a substantive need for information by MPs and were not used to delay deliberation.

While external academic expertise was not solicited by the committees, there was an attempt to influence NFE-CS deliberation with a strategically positioned (Interview XXXIV) newspaper article by René Rhinow (2002), former Councillor of States and professor of law at the University of Basel. Rhinow, one of the architects of the constitutional reform, criticized what he perceived as the introduction of a fourth territorial level into the Constitution which lacked democratic account-

ability. This concerned the NFE instrument of 'forced' inter-cantonal contracting. This means that when a qualified majority of cantons decides to establish a contract for the joint provision and financing of a given task, they can petition the federal government to force the remaining cantons to join that contract in order to prevent free-riding. Alarmed, the project organization asked Prof. Rainer Schweizer to provide counter arguments to the committee, which he also published in the press as a reply to Rhinow (cf. Schweizer, 2002c).[21] According to Interviewee XXXV, Rhinow's stunt did not much move committee members, for they already knew their former colleague Rhinow and his position very well.

The public audience

From the beginning of the NFE project in 1994 to the ballot vote in 2004, press coverage[22] followed the project rhythm. In addition to coverage of the major events – inception, consultation procedures, approbation by the cantons, parliamentary debate, and the referendum campaign – newspapers like *Neue Zürcher Zeitung* offered a platform for guest authors to (ap)praise and critique the project. Comparing these contributions – which were often an affirmation occasioning a reply – with non-public documentation from the decision-making process reveals that they often replicated behind the scenes discussion, making use of the limelight for additional leverage (e.g. the Rhinow/Schweizer exchange). It was by this mechanism that the two most politically significant expert reports by Frey et al. (1994) and Frey and Schaltegger (2001b) were made public (cf. Meier and Spillmann, 1994; Frey and Schaltegger, 2001a). In addition to this, Frey (2004) also wrote an article endorsing the reform a month before the referendum vote and accompanied governmental officials during some press conferences (Interview XXXIII). But there is no evidence that the project used Frey or any other adviser as part of a campaign strategy. Interviewee XXXIII asserts that Frey wrote these articles on his own initiative. Moreover, Frey continued to write about the NFE beyond even after implementation began in 2008.[23]

[21] In the article, Schweizer is identified as long standing adviser to CCG.

[22] I mostly draw on the *Neue Zürcher Zeitung* for this assessment.

[23] This is indirectly corroborated by Interviewee XL who reports that another important expert had no media contact through the project.

8.5 Discussion

This chapter has presented the background to the NFE reform, analyzed the perspectives of collective actors who mobilized expertise, and looked at sites of policy negotiation involving scientific expertise. The remainder of this chapter takes stock of the empirical analysis laid out in these preceding parts, and provides an evaluation in the light of the by now familiar concepts of issue and arena structure. It further looks at the link between expertise mobilization and the broader policy commitments of the actors behind this. It concludes with a look at what consequences expert mobilization engendered on the policy formulation process.

Action context

Assessment of the NFE action context requires us to distinguish – rather more than in the other cases – between the subjective perspective of key actors (i.e. the project leadership) and the conflicts observed during the policy process. Making this distinction evident is important because the arena dominating the NFE policy process was not so much given, as the product of constant strategizing. As an institutional reform, the NFE was not rooted in an active and preexisting policy subsystem. One of the first steps in the process was therefore to build a reform coalition around the shared perception that reform was necessary, and that such reform should remediate inter-cantonal wealth disparities through enabling and empowering the cantons in the exercise of their competencies and responsibilities. Attaining such a goal consensus was certainly not hindered by the fact that awareness of inefficiencies related to multilevel governance did not materialize out of thin air: the NFE was preceded by other reform attempts during the 1980s (Freiburghaus, 2001). Because of its inclusiveness and institutional (as opposed to sectoral) character, the reform coalition was virtually identical with the policy subsystem. Nevertheless, a few elements from past or parallel reform projects (e.g. the constitutional revision project) exercised a structuring impact, thereby attenuating this importance of strategy. These path-dependent influences inspired the project organization and contributed constitutional legal expertise from inside and outside of the administration (e.g. FOJ deputy director Mader and professors Schweizer and Ruch).

Actual disagreement about the values at stake was rare and tended to concern the reform instruments, some of which were incongruent with the parliamentary delegation of the Social Democratic Party. Clearly opposing value pairs stood behind beliefs in more decentralization (i.e. that fiscal equivalence and subsidiarity equals more democracy, and that efficiency and innovation emerge through competition) and the social democratic belief in greater centralization as the steward of equality. This boils down to different concepts of justice, with the acceptance of inequality in outcomes being more firmly rooted in Swiss political culture.

The reform concept's epistemic foundation – that is, fiscal federalism – received broad and sustained support, as it was congruent with the Swiss conception of federalism. Moreover, every major study and analytical report arrived at congruent findings (the 1991 FFA report, the 1992 CCFD reply, and the 1994 expert report, etc.). However, there were conflicts around what we might call '*will be*' issues. The reform sponsors always claimed that the NFE's outcome would benefit the entire country. This factual assertion was challenged by those who saw their interests as better served by the *status quo*. Yet these conflicts did not result in a clear dichotomy between losers and winners. For instance, while small cantons feared the empowerment of large cantons through enhanced horizontal contracting, many of them were to benefit substantially from better financial compensations and the equalization of topographical burdens. For the big net contributor Zurich, task disentanglement and associated efficiency gains made its contribution worthwhile. Zurich and other urban centers were also to benefit from the equalization of socio-economic burdens. For Zug, although a fierce opponent, the NFE was still better than the social democratic menace of tax rate harmonization by the federal government. Finally, the transitory compensation fund ensured that the system transition did not harm anybody immediately. This leaves only sectoral interests, who did not mind the reform as long as it took place outside their backyard. Some were ultimately exempt from the reform while others received concessions in the form of the creation of joint tasks (leaving multilevel policy networks in place) or guarantees (a three year transition period for the domain of handicapped care-taking institutions). Thus, while a firm majority shared the reform's general direction of 'reviving' federalism, there was no shortage of (clearly anticipated) redistributive struggle.

While such epistemic conflicts were only made manifest rather late in the process, the project organization clearly anticipated them early on, as evidenced by the rationale behind their mandating of the 1994 expert report. The project organization fought the outbreak and expansion of such conflicts with cognitive and material resources. Its information policy was designed to preempt leaks while simultaneously reaching out to the public, whose approval was needed in the mandatory ballot vote. But when this public media debate was used to voice dissent, this was immediately 'policed' by a public reply by the project organization. When the project was criticized as too finance-centric (in the 1996 consultation procedure), it was reframed in terms of a reform of federalism, a move motivated by the political calculus that cross-sectoral reform was not possible without stakeholder integration. And when the project almost died, due to the resistance of the French speaking cantons, a transitory compensation fund was created. In sum, the action situation was characterized by a latent semi-structured issue with conflicts about *will be* questions. It was mainly due to strategic maneuvering that this latent conflict structure did not become manifest in a more virulent way.

Causes of expertise mobilization

The empirical analysis introduced a distinction between the mobilization of expertise with or without a wider audience in mind. Not much remains to be said about expert reports and in-person assistance, the demand for which originated in the project's working groups. These working groups had a clear mandate, operated under a binding hierarchy, and lacked a public profile. They had to deliver a task and when this task exceeded their capacity and competency, they called for expert assistance. While the presentation of these reports to cantonal delegates within CCFD and CCG may have facilitated consensus formation, this coordinative function was not part of the mobilization rationale. In contrast, the politically salient mandates of 1994 (Frey et al., 1994) and 2001 (Frey and Schaltegger, 2001b; Kirchgässner and Hauser, 2001) were mandated with a clear social coordination motive in mind. While FFA and CCFD had established a shared problem diagnosis and reform orientation, it was FFA's anticipation of resistance and concern about its own credibility as an *interested* reform sponsor that motivated the mandating of the 1994 report,

with its elaborate showcasing inside and outside the federal government. Similarly, the 2001 reports originated in a situation where the project was in desperate need of gaining political support (the cantonal approbation process within CCFD and CCG, as well as the anticipation of parliamentary deliberation). Having established technocratic as well as political contexts as drivers for expertise mobilization, we can now turn to the final point: investigating the consequences of these instances of expertise on the policy formulation process itself.

Consequences of expertise mobilization

Looking at the outcomes of scientific expertise in a project as large in scale as the NFE is inevitably limited by the available data[24] and by the complexity of the issue. I am not in a position to trace what became of every expert report, particularly not those that remained within the confines of the working groups. I am not alone in this problem. Policy formulation in the working groups was a collective enterprise, quickly rendering idea attribution to an individual source impossible (Interview XXXVI). But, based on the general flow of information inside the project as well as on information provided by various interviewees, it can be confidently assumed that the core elements of working group related expert reports were integrated into the respective group's intermediary or final report. This content will therefore have ended up in the dispatch after having been assessed, as part of these reports, by the managing committee and the political steering committee. Given the overlap of those who formulated the questions, hired the experts, and constituted the reports' audiences, a kind of *equivalence* seems to have been at work.

This equivalence was not present in *politically* motivated instances of expertise mobilization, because the intended audience of these reports was not identical to the group of actors who phrased the research questions and hired the experts. While there is no measure of the extent to which the 1994 report effectively enabled the necessary social coordination of the project, it became part of its official genealogy, and is identified in every major policy document as a key element in the decision to initiate the reform. This story line was taken up by the *Neue Zürcher Zeitung* and

[24] Access to meeting minutes of the work groups was limited by incomplete filing and restricted archival access.

repeated in every major article on the reform process. The later report by Frey and Schaltegger (2001b) served a similar narrative purpose. It certified the project as scientifically sound, providing a crucial argument for the necessary nature of the reform.

In contrast to these coordinative effects, the extent to which the 1994 reform concept proposed by Frey et al. (1994) retained its coherence as NFE's backbone demands explanation. Firstly, there was an ideational congruence of the proposed reform instruments with Swiss political culture. The studies and the recommendations they underwrote were embedded within a set of economic policy ideas that gained increasing acceptance during the 1990s (Afonso, 2007; Mach, 2002).[25] On the one hand, the effect of the economic slump of the 1990s on the budgetary situation afforded fiscal policy special salience. On the other, relatively young, liberal civil servants with neoclassical economic training advanced to leading positions. This provided fertile ground for the political uptake of new public management and institutional economic concepts. Interviewee XXXIII reckons that most of these concepts had several years, if not decades, of gestation within the academic community of Swiss economists before gaining public traction in the 1990s. In addition to this ideational congruence, there are also organizational factors. There was one dominant principal behind expertise mobilization – FFA and CCFD/CCG – who gained coherence through doing so. This reduced the propensity of members of the reform sponsorship coalition to criticize the findings of these reports. Furthermore, there was a relatively low risk of academic economists criticizing the project, due to their strong investment in it.

Secondly, the 1994 report did not provide fundamentally new insights. In an admittedly much coarser shape, all its major findings and reform ideas had been articulated in the FFA evaluation and CCFD reform concept. These ideas then became the initial input for the working groups, much of whose work was to translate these economic concepts and instruments into the normative language of the law. This is where I see the specific division of labor within the working groups as important for the continued coherence of these ideas. Each group effectively

[25] See also the discussion of economic policy instruments in environmental governance in the previous chapter.

operated within a silo, and these silos were fairly congruent with the individual reform instruments. In addition, the managing committee applied course correction when working groups strayed from their mandate. The same system separated instrumentation working groups from groups negotiating the disentanglement of specific tasks after 1996. According to Interviewee XXVIII, the creation of the transitory compensation fund was an additional element preventing interference with the reform's core pillars.

We can only speculate what would have happened if the principles of fiscal federalism had been more contested, or if a different project organization had been adopted. But it is important to recognize that expertise and ideas attain stability through the social organization of their carriers. The 1994 report neither brought into being the principle of symmetric participation between the cantons and the federal government, nor was the hierarchical organization based on it. However, its clearly articulated reform pillars – following the economist Jan Tinbergen's rule of separate instruments for each policy goal – were conducive to a thematic division of labor that further increased the coherence of these instruments.

In concluding this chapter, the empirical evidence enables us to lay to rest an argument between Braun (2009) and Cappelletti et al. (2014) about which factors enabled the NFE reform to succeed. Braun (2009) argued that it was the strategy of dividing policy design work and the settlement of distributional consequences into two legislative packages that enabled a sustained focus on questions of design and puzzling. Cappelletti et al. (2014) disagree. They see bargaining and deal-making as dominant modes of interaction throughout the decision-making process. They content that compromise was only achieved through the accommodation of interests (e.g. the transition fund and other side payments). Thus, this argument focuses on whether puzzling or powering was the decisive mode of interaction that helped the reform to succeed.

As I have argued earlier (cf. section 3.4), the premises of such an argument are flawed. Powering and puzzling take place in any decision-making process, and are often mutually constitutive. There couldn't be a better empirical case than the NFE reform to illustrate that puzzling and powering are both necessary, with one laying the groundwork for the other. For instance, Cappelletti et al. (2014) argue that

the different reform pillars produced an interlocking system of interest compensation. As an illustration, the canton Zurich became a top contributor concerning fiscal equalization with NFE. But forced inter-cantonal cooperation, with spillover compensation and the compensation fund for social welfare expenditures, represent a gain for Zurich. There is no doubt that such package deals were decisive. But the system of interlocking reform pillars was largely a product of puzzling by CCFD and the 1994 expert report. Similarly, when Cappelletti et al. argue that side payments (i.e. the transition compensation fund) and resizing of reform ambitions were necessary as concessions, they are also correct. But they neglect the nexus of puzzling that took place simultaneously to these negotiations in form of the 2001 expert report by Frey et al., which was crucial for reminding the individual parties of the project's overall goals and benefits. This list is not exhaustive, but it demonstrates that the 'NFE system' is a hybrid construct between rational and political elements. Powering was by no means absent, but the segmentation into different thematic silos had the (unanticipated) effect of containing conflicts during policy formulation.

Nine

Conclusion

9.1 Introduction

In this thesis I have set out to study the causes for and consequences of the mobilization of scientific expertise, as it occurs in policy formulation processes at the Swiss federal level of government. In the light of the continuing importance of scientific expertise as a decision support for a broad range of policy domains, I have argued that studying scientific expertise is relevant because it is perceived as dysfunctional; because its practice has implications for democratic accountability; and because its social processes take place at the interface between science and politics. I have further argued that there is a significant research gap because the multidisciplinary literature has privileged a micro-sociological approach, inquiring into individual attitudes about research utilization and conducting single-site studies of organizational behavior as it is related to expertise production. There is a genuine shortage of empirical studies that focus on the role of scientific expertise in policy formulation and which adequately treat it as a phenomenon of collective action. This is especially true for Switzerland, with its unique decision-making process and legacy of informal contacts between public and private actors.

Consequently, the study took policy formulation as its empirical site in order to investigate the questions *what instances of scientific expertise occur during policy formulation?*, *what causes their manifestation?*, and *what are their consequences on the policy process?* My core assumption was that scientific expertise – understood as containing both informational and symbolic properties – constitutes a resource for political actors, which they value according to its utility in the pursuit of their commitment in the policy arena.

I developed a two tier approach for the investigation of the causes of expertise

mobilization. By looking at the institutions of the policy process and the organization of expertise production, I inquired into the *distribution of access* to scientific expertise in order to learn which public and private actors exert control over its mobilization. This institutional analysis also aimed to elucidate whether the political system is conducive to a predominantly coordinative or communicative discourse of legitimation. Identifying the dominant discourse allows us to situate expertise as predominantly being addressed either to members of the policy subsystem or to the public at large.

The analysis of three policy formulation processes constituted the second layer of the study. Inspired by an interpretive account of political life, I argued that decisions about scientific expertise are always taken in concrete situations, which collective actors assess against the backdrop of their commitments within the policy arena. I further contended that the expected structure of an action situation makes political actors (capable of mandating expertise) value expertise more or less as an action resource. The structure of an action situation is defined by the presence or absence of conflicts about values (goals) and the relevant knowledge at stake.

Recognizing that scientific expertise can only ever be an intermediatory factor in an explanation of policy coordination and design, I advanced the argument that the effective structure of policy problems may mediate such effects. The more structured a problem is, the more overlap there is between the principals of expertise mobilization and its intended audience, rendering an influence on policy design more likely.

Having synthesized this study's conceptual framework, the rest of this chapter will draw together the findings from the four preceding empirical chapters and scrutinize them with regard to the theoretical expectations. Consideration of the scope for generalization of these findings will follow, providing a basis for addressing the study's relevance in terms of the efficiency of scientific expertise and the democratic implication of expertise mobilization. The chapter concludes with an appraisal of the study's contribution to theory on scientific expertise in public policy.

9.2 Findings

The distribution of expertise

Beginning with the institutional effects of organization and distribution of access to scientific expertise, the analysis arrives at a single key conclusion. Both the analysis of the institutional setup of the political and advisory system, and that of the three case studies, have shown that the capacity to mobilize scientific expertise in policy formulation is strongly concentrated in the hands of the federal administration. The lion's share of policy relevant research is funded by the federal government, with the federal administration exerting direct control over the budgets of agency research and short term expert mandates. Moreover, it is the executive branch of government that controls the establishment of extra-parliamentary committees and their staffing.

Within the three cases, direct demand by federal agencies accounted for the majority of expert intervention. In the stem cell research case, the existence of two independent and *actively engaged* advisory committees to some extent counterbalanced the administration's expert monopoly. Civil society actors such as the political parties did not generally mandate independent expertise. Instead, parliamentary groups of the political parties made do with the resources of the semi-professional militia system. They sought competence within their own networks by hearing cantonal ministers and civil servants from their own parties. Occasionally they enlisted the help of professors from amongst their ranks, as was the case for Hans Schmid's tax harmonization report for the Social Democratic Party, or, in the stem cell case, invited relevant scientists to a hearing. Similarly, Parliament's capacity to mobilize expertise independently has proven very small. Such expertise was almost entirely provided by the federal administration. The latter even played (and by most accounts continues to play) the role of key informant in determining whom to invite for a committee hearing. Such hearings, however, are designed more to elucidate the spectrum of available positions and convey to stakeholders that Parliament recognizes their grievances. It is thus not uncommon that a scientist and an interest group representative would be heard on equal terms.

This strongly biased distribution of access to expertise also adds evidence in

support of the contention that the electoral arena has virtually no importance for expertise mobilization. Federal Councillors are elected by Parliament and do not have to appeal directly to the population. The federal administration is similarly largely sheltered from the electoral cycle. Further, legislative projects regularly span across multiple legislatures, as was clearly the case with the NFE reform and the CO_2 Act. In addition, the three studied policy formulation processes took place under the successive responsibility of several Federal Councillors. The stem cell case began under Dreifuss, who handed over the dossier to her successor Couchepin. It was Cotti who originally pushed for a Swiss CO_2 reduction initiative, handing over to Dreifuss midway, with Leuenberger taking over during parliamentary deliberation. Finally, the NFE reform began under Stich, was refined under Villiger, and concluded by Merz.

The fairly low policy relevance of the electoral arena and the political system's diffusion of power (due to numerous veto points), should – according to the theoretical expectations – be conducive to the mobilization of expertise primarily in order to rally policy subsystem participants around a shared frame, rather than asserting a policy's rational foundation in public. Indeed, a coordinative/persuasive intent behind expertise mobilization can be clearly identified in all three case studies. The political assessment of a situation always *preceded* the decision to mandate an expert report, and in several instances there is clear evidence – the 'political' NFE expert reports, FOPH's solicitation of Rainer Schweizer, the production of economic impact assessments for the CO_2 Act – that such decisions were driven *in anticipation* of challenges to the federal administration's positions. This is in contrast to the referendum arena, where the executive did not advance expert arguments for legitimating its position. However, the referendum debates in the NFE and stem cell cases were not entirely devoid of expert appearances (e.g. in the pre-vote 'Arena' program on national television), but occupied a rather small space.

Having established the federal administration as the main principal behind mobilization of scientific expertise, and the pre-parliamentary phase as the main venue for this, the next section will discuss the impact of political polarization on scientific expertise.

Is expertise becoming politicized?

As chapter 5 has shown, the Swiss political system is undergoing transformation due to internationalization and political polarization, with the consequence that political inclusion during the pre-parliamentary phase is in decline. As shown in the same chapter, pre-emptive inclusion has been used to reduce the decision-making uncertainty derived from direct democracy. But what impact do these transformations have on scientific expertise? Does increased media scrutiny of the policy process and increased political polarization lead to increased expertise pluralism and the politicization of science? To follow Weingart (1999), such a development would have detrimental effects on scientific credibility.

There is, to my knowledge, no hard data that would allow a clear answer to this question. For instance, we do not know whether scientific experts and their activity receive more media coverage today than 15 or 30 years ago. Moreover, we are dealing with complex causalities. Changes to the Swiss political system are not the product of a single factor (Papadopoulos, 2008), and the proposed notion of an advisory system is connected to the political system in multiple ways. We may, however, attempt to trace certain causal pathways.

We can begin with the declining importance of political inclusion during the pre-parliamentary phase, and the increasing functional differentiation of the political elite. This reduces the interface between the federal administration and independent expert commissions, as the latter have no dedicated access points to venues of policy formulation. While there is no data enabling a comparison through time, it is conceivable that independent advisory bodies now have to rely more on the media to spread their message, because the informal core of the political system is breaking up due to functional differentiation and less inclusive policy-making. At least for the three advisory bodies (NACBE, TA-Swiss and OcCC) analyzed in this study, media relations are important, and they all maintain active connections to the news media.

Another avenue to explore concerns the decline of expertise produced within elite networks, and the rise of (professionalized) mandate-based expertise. This shift in the organization of expertise production is driven by functional differentia-

tion of the elite, and by dynamics endogenous to the scientific community. This organizational shift empowers the principals of expertise mobilization – which mostly means the federal administration in connection with federal-level policy – because public visibility of expertise mobilization can be better controlled. For instance, the contract governing an expertise mandate includes provisions about result publication and ownership. Unless otherwise negotiated, publication decisions are the prerogative of the mandating party (e.g. the federal administration). This information control is not absolute because of the new transparency regulations discussed earlier: the administration eventually has to publish commissioned reports, but the exact timing of publication can remain a discretionary choice. Consequently, the public visibility of expertise mobilization is to no small extent dependent on the federal administration's interest in publicity, and increased political polarization may affect such interest. As Parliament has become less inclined to rubber stamp legislation proposed by the executive, and as such proposals struggle to find legitimation through claims of political inclusion during the pre-parliamentary phase, the executive may find more use for expert pronouncements as a way of backing up its claims in Parliament. This may, in fact, fuel the politicization of expertise. But there are limits to such politicization. Members of Parliament are only in a position to rhetorically attack and question expert-backed arguments proposed by the administration, as they mostly lack the necessary resources to counter them with their own expertise. In that sense the demand monopoly character of the Swiss advisory system works against the politicization of expertise: a US-like adversarial culture of expertise is simply impossible in such a context.

Independently of whether the mobilization of expertise has been receiving more media coverage as a result of recent transformations to the political system, we have to construe media publicity as a phenomenon that is instrumentalized by participants in policy formulation for their own purposes. For instance, all three cases have shown that a consultation procedure is a moment 'to go public', not only in the sense of presenting a project, but also in order to woo support. In all cases, academic experts have participated in publicized debate during the consultation procedure. Moreover, the referendum campaigns of the stem cell and NFE cases included public pronouncements by advisers (e.g. René Frey in the NFE case). These

public contributions, I have been assured, were not commissioned by the federal administration, but were self-motivated. But the CO_2 and NFE cases also demonstrate that the administration takes active measures to counter criticism of their expertise by facilitating public reply articles. The question then becomes who these contributions target. Are they addressed at other subsystem participants, with the message's public visibility acting as leverage, or, conversely, is publicity-seeking motivated by wanting to address the general public? The available data does not allow for a clear answer to this question, but it suggests that controlling information flow in the media is also part of the coordinative discourse. If we take the NFE case, with its constant need to ensure the coherence of the reform coalition (at its peak, I was told, a hundred people actively participated in the reform) information control and an explicit media policy become indispensable instruments.[1] Assuming that communication through the media is indeed a feature of the coordinative discourse, we may speculate that the increasing social distance among the elite induced by functional differentiation even increases the need for communicating through the media in order to obtain coordination.

In sum, the transformations in the Swiss political system may have an influence on the advisory system, but the directions of the effects are not always clear. Nevertheless, it is important to keep in mind that expert argumentation ultimately remains specialized argumentation, addressed at a specialist audience. The federal administration may have much power in that regard, but its legitimate place rests within the political subsystem. The Federal Council and Parliament ultimately justify their choices in public, and there is no evidence that wooing the people with expert-backed arguments would enhance the legitimacy of such decisions, given the place of science in Swiss political culture.

Cases and their issue structures

I have argued that agreement and disagreement about values and the relevant knowledge at stake provides varying incentives to draw (or not draw) on scientific expertise as a resource for the actualization of particular policy commitments. In other

[1] While the NFE case is certainly exceptional in its amplitude, its participant network featuring a single dominant coalition corresponds in fact to the most common power structure among the most important decision-making processes during the early 2000s in Switzerland (Fischer, 2012).

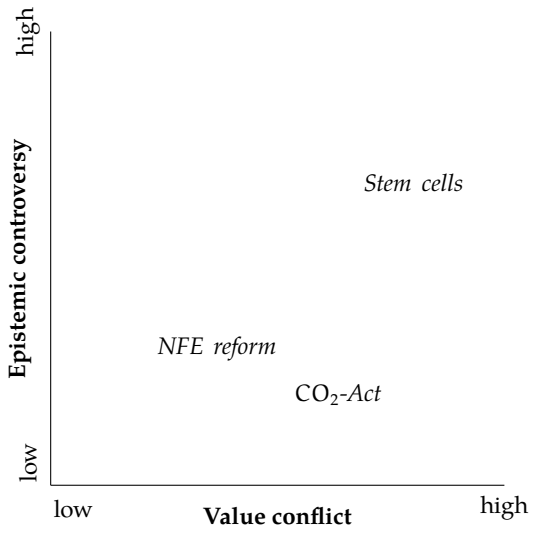

Figure 9.1: Issue structure of the three case studies. *Source:* author's illustration.

words, whether or not scientific expertise is regarded as useful for achieving a policy goal is a function of an actor's perception of the situation which s/he is in. An action situation, in turn, is determined by the structure of the issue at hand.

The empirical analysis shows that in all three cases studied, issue structures and their perception by the actors who mobilized expertise remained stable once a problem had been framed. Important strategical maneuvers, such as the introduction of an emission reduction target instead of a fixed emission tax in the CO_2 Act case, or the rebranding of the NFE from a fiscal equalization to a federalism reform, were reactions to an underestimate of the *intensity* of political opposition. They came about neither because resistance as such had not been anticipated, nor because the issue changed in structure. Thus, each case had a single and stable issue structure. It is also important to note that scientific expertise neither caused nor modified the structure of issues because, in all cases, the mandating of external expertise took place *after* the federal government had internally articulated the broad direction that policy formulation should follow. However, while not affecting the perception of interaction dynamics, expertise in the NFE case deviates somewhat from that assessment, as it contributed to stopping latent conflicts becoming too salient.

Figure 9.1 illustrates the issue structure of the three cases, as obtained by analyzing the commitments of actors who had mobilized scientific expertise. I qualified the stem cell research issue as relatively unstructured. Important epistemic

questions, such as the transdifferentiation potential of adult stem cells and the constitutionality of the stem cell research act, as well as the core normative questions surrounding the instrumentalization of unborn life, remained contested throughout the process. However, as I have demonstrated, the federal government treated the issue more like a semi-structured value controversy by relegating substantive decisions concerning stem cell science to policy implementation. The CO_2 emission reduction case was semi-structured. It showed little signs of disagreement around the central epistemic premise that climate change is a fact, and that human activity plays a discernible role. However, the economy/ecology goal conflict and associated questions about the distribution of a countermeasure's burden had always been anticipated, and could only be contained through international policy coordination. The NFE case was also semi-structured. Unlike the CO_2 case, its conflicts were located on the epistemic rather than the normative axis and revolved around diverging projections about the reform's outcomes ('*will be*' questions). The reform sponsors clearly anticipated such challenges and constantly (and ultimately successfully) devised strategies to prevent the degeneration of the problem structure.

In sum, the cases studied turned out to not be quite ideal typical, in the sense that they converged toward the center of the typology, rather than its corners. As a consequence, each case also displays some traits of a neighboring issue structure. This, and the fact that issue perception can deviate from actual structure – as was evident in the stem cell case – is not incompatible with the premises of the issue typology (Hoppe, 2010: 75). Moreover, it should not be taken as a contradiction to my earlier statement that the studied cases had a single and stable issue structure, for it refers to the fact that however mixed the cases may have been, they nonetheless remained the same throughout the decision-making process. This fulfills the condition (postulated in section 4.2) of treating the empirical decision-making process as identical with the conceptual case.

Causes of expertise mobilization

This classification of the cases according to their issue structure allows for the evaluation of the theoretical predictions regarding expertise mobilization. As a reminder, decisions about expertise mobilization are not so much influenced by *actual* issue

structures as they are conditioned by the always situated (and anticipatory) perspectives of policymakers. This distinction between perceived and actualized issue structures can now be put to analytical use.

Beginning with the stem cell case, I argued that issues of science policy involve scientists because they are a central target group. Indeed, scientists and institutions of science played a prominent role in the stem cell case overall. However, this offers little indication of expertise mobilization decisions. Here we need to differentiate between the motives of the federal government and of institutionalized advisory bodies. As elaborated, the government conceived the issue more in terms of a value controversy than a fully unstructured issue. Its ensuing strategy of depoliticization is congruent with theoretical expectations, although the specific strategy of procedural settlement has to be viewed in the light of Swiss democracy (where a conflict that is not settled may engender a popular initiative), and in connection with past experience of preemptive depoliticization of xenotransplantation. FOPH's mandate for Rainer Schweizer served as an insurance in that strategy, rather than to provide fundamentally new information to the administration. The involvement of other expertise on science governance has a lot to do with past politicization of biotechnological issues (e.g. GMOs), as a response to which Switzerland (and other countries) fostered an approach to science policy controversies that seeks to engage publics so as to democratize scientific governance. *Science et Cité* and TA-Swiss (and to a lesser extent NACBE) were organizations committed to such an approach to scientific governance. However, the government only controlled the activities it mandated from *Science et Cité*.

The CO_2 emission reduction issue always contained a goal conflict with redistributive implications, which, according to theoretical expectations, lowers the value of scientific expertise. There is enough evidence to substantiate the argument that the Federal Council and the different offices of the federal administration implicated in policy work clearly anticipated this issue structure. FOEN's limited interest in climate change research, which it only referred to in potentially contentious situations, is therefore not surprising. On the other hand, both the Federal Council and industry were equally interested in learning about distributional consequences. This created a sideshow of conflict about the assertion that CO_2 emission reduction,

at a certain rate, could be economically beneficial. However, it is necessary to consider that energy modeling, unlike other instances of advisory demand for expert knowledge, is tightly integrated with bureaucratic routines. During the 1990s, the administration decided on the model parameters, while the technical implementation was outsourced for path-dependent reasons. Moreover, the computation of environmental and economic outcomes was intrinsically linked to the incentive tax as a policy instrument.

In the NFE case, the reform sponsor's issue perception (primarily of FFA) clearly anticipated a semi-structured issue with possible challenges to claims about the welfare outcomes of the reform. The theoretical expectations that expertise is valued for persuasive purposes in such a case fits well with the reform coalition's expertise mobilization behavior. Several mandated studies were intended to enhance the reform's credibility and were deliberately given a public profile in order to convey the message that the *NFE system* benefits the country as a whole. Within the working groups, where problems were clearly structured, expertise mobilization followed the rationale of complementing missing technical competencies. This again fits the expectations for more structured issues.

In sum, the empirically observed patterns of expertise mobilization are rather congruent with the theoretical expectations. However, the model cannot account for specific historical lessons of how to deal with a problem (e.g. science policy controversies). A case similar in structure to the stem cell controversy would probably have inspired depoliticization strategies through active inclusion of stakeholders, rather than the strategy of going public.

Consequences of expertise mobilization

As argued in the theory chapter (section 3.5), scientific expertise can only exert an influence on policy design and politics if it has actually been mobilized. Moreover, any such influence is mediated by path-dependent structural elements, processual dynamics, and serendipity. There is plenty of evidence of such influence in the data. Every case study showed that expertise mobilization followed, rather than preceded, the articulation of a general position by the federal administration. Moreover, mobilized expertise engendered consequences *only* in conjunction with other

factors, regardless of whether such consequences were cognitive or social in nature. Such interdependencies may be endogenous to an action situation, such as when an expert report relied on a predecessor report. For example, many of the NFE reports materially relied on the foundations laid out by the 1994 report. This also concerns clusters where a report was mandated in order to dispute another one (e.g. Zug mandated its study in reaction to Frey's 2001 assessment. The project organization in turn hired Kirchgässner and Hauser to challenge Zug's contention).

But there are also factors which intervene from outside the action situation. For instance, the NFE project organization – which was important for the continuing coherence of the proposed reform pillars – came about because of similar past and parallel modes of organizing collaboration between the federal government and the cantons. Similarly, the organization of energy modeling in the CO_2 Act case was the product of earlier energy policy formulation. Moreover, the advisory arrangement in the stem cell case was entirely the product of past biomedical policymaking.

In addition to these endogenous and exogenous elements, rather contingent factors were also at work. Schweizer's important role during committee deliberation of the stem cell act, for instance, could never have been foreseen when the administration mandated him in the first place. The importance of such interdependencies seems to have been least where the principals (i.e. the mandating agency) and the intended audience of an expert report were identical. This was the case for studies mandated by the NFE working groups. But this has to be immediately put in perspective, since the existence of these working groups was itself dependent on other factors. These findings clearly show that the mobilization of expertise is a necessary, but far from sufficient, condition for explaining any kind of expertise-related outcome.

But what can we say about the influence of issue structures on the outcomes of mobilized expertise? The suggested causal mechanism construes issue structures as translating into particular network structures in the policy arena, which in turn mediates the cognitive and social consequences of expertise. For an issue, like the stem cell research case, located between a semi-structured problem with disagreements about values at stake and an unstructured issue, theory predicts that experts in the capacity of a mediator or – if more unstructured – of a ordinary participant

engender an influence on policy politics, rather than design. To a large extent this was the case. Schweizer, aided by his professional monopoly and high status among politicians, came to play a mediating role. By stressing procedural rather than substantive arguments, NACBE also played such a role, despite being too young to have such a reputation. This mediating role was most strongly felt in the Council of States, and also left some traces in the bill (reduction of scope, patenting, etc.). But this mediating role was not all-powerful. Opponents invariably stuck to the line of argumentation they deployed from the very beginning. Whichever arguments fitted their line of thought were adopted as evidence, which demonstrates to what extent advisory reports are subject to interpretive flexibility.

Assessment of the CO_2 case remains relatively limited in this context, as expertise was largely left at bay. The use of energy and economic impact assessment models was intrinsically linked to the proposed steering tax as a policy instrument, and the federal administration was strongly implicated in their production process. In the light of the strong goal conflict between the environment and the economy, it is not surprising that arguments about distributional outcomes, backed with evidence from model computations, could not change entrenched convictions. The controversy about the 'double dividend' of CO_2 emission reduction is a good illustration of this.

The NFE case – with its significant goal consensus and disagreements about knowledge related to the outcomes of the reform instruments – should lead to design and coordination effects of scientific expertise. This was indeed the case. Design work drew inspiration from the 1994 expert report, and the working groups relied on the support of several external consultants. There is also evidence that mobilized expertise had a stabilizing effect on the reform coalition, although always in concert with other factors. For instance, if we consider Frey's 2001 report, which reportedly reinforced convictions of the project's merits, we simultaneously have to recognize that the transitory compensation fund established at the same time had a similarly cohesive effect.

These findings support the theoretical predictions that issue structure matters for explaining the consequences of expertise mobilization. This evidence also shows that the more conflictual the value dimension of an issue is, the less effective that

mobilization of expertise is for social coordination. The mediating impact of NACBE and Prof. Schweizer in the stem cell case are not a contradiction in that regard, as their testimony shaped the opinion of actors without a preconceived position, while having virtually no traction on committed critics.

Summary of results

The findings of this study can now be summarized in three broad lessons. Firstly, this research has shown that the ability to access and control scientific expertise is strongly concentrated in the hands of the federal administration. Civil society actors have weak capabilities to mobilize scientific expertise, and the autonomy of institutionalized advisory bodies is limited. Moreover, the production of scientific expertise is undergoing a process of professionalization which strengthens the position of the federal administration as the (main) mandating principal. Secondly, despite increased political polarization and less inclusive decision-making, scientific expertise remains anchored in the policy subsystem, rather than being used as an effort towards legitimation in the wider population. The monopolistic demand structure for scientific expertise, the relatively low relevance of elections for policy, and the absence of a link between trust in political institutions and trust in science all work against the politicization of science. Thirdly, the structure of a policy problem matters both for expertise mobilization and for the latter's impact on the policy process by conditioning conflict structures and their anticipation. Structured problems result in a greater overlap between the principal of expertise mobilization and its intended audience, thereby increasing the chance that expertise shapes policy design. Conversely, less structured problems, especially those that involve conflicts about values and goals, reduce the impact of mobilized expertise. Whatever the consequence of mobilized scientific expertise may be, it is always mediated by structural, organizational, and serendipitous factors.

9.3 Generalizability of the findings

Having summarized the research findings, we can now discuss their robustness by probing the limits of their generalizability. This is not a straightforward operation

as the research design builds on a contrasting, and not a sampling, logic. Consequently, the question is less whether a particular case is a representative choice for one of its kind, but to what extent the observed dynamics correspond to findings from other studies.

Many of this research's findings regarding the basic traits of the Swiss advisory system receive empirical confirmation through Frey's (2010a: 235, 266) study on the use of policy evaluation evidence in reform processes. The fact that the policy domains she analyzed (road transportation safety, asylum policy, drug policy, and health care) do not overlap with the cases this study investigated but nevertheless share the same timeframe allows for useful comparison. In essence, Frey confirms that the federal administration is the most important principal of scientific expertise, which it mainly mandates from external providers. Moreover, she also finds that Parliament is dependent on the federal administration in the consideration of policy analysis.

As this research demonstrated, the Swiss advisory system has changed over the past two to three decades as a result of changes within the political and scientific system (though changes to the latter have not been investigated systematically). This makes it important to consider the obstacles to generalization over time. As we look into the future, the advisory system will most likely continue to be professionalized, as the structural foundations for scientific public engagement in the republican tradition continue to erode. Amid high tenure uncertainty for young researchers in Switzerland (cf. Buchholz et al., 2009: 97ff.), a practice-oriented research agenda is only viable if it translates into the acquisition of project funding. This, however, puts academic suppliers in competition with private sector providers and forces professionalization. Moreover, the federal administration is likely to maintain its central position in the advisory system, as there are no indications that resource distribution might shift (e.g. public financing of political parties).

What can we say about the generalizability of the research findings regarding the influence of problem structuring on expertise mobilization and its consequences? The first point to acknowledge is that, even though the findings were largely congruent with the theoretical propositions advanced, the cases tended to gravitate towards the center of the typology, rather than taking on ideal typical extreme values.

However, given that such ideal typical cases are likely rare, the decision-making processes analyzed are more representative of ordinary decision-making patterns in Switzerland. But how representative they really are is difficult to assess. Fischer (2012), for instance, shows that policy network structures with a dominant coalition, as was the case in the NFE reform, appear in the majority of the most important decision-making processes during the early 2000s. Fischer, in the same study, also assesses the reputation of different actors, including scientific experts. However, due to conceptual differences and the fact that he does not distinguish between experts and other participants, his data cannot be used to assess validity of this study's findings (cf. section 9.4).

Frey's (2010a) study is more useful in that regard, as it explicitly attempts to assess the impact of the political context on the use of policy evaluation evidence. There are conceptual differences with this study, too, but just as with the problem structure typology, Frey's consideration of goal conflicts as an explanatory variable offers some comparability. She shows that evaluation evidence, if present, impacts politics rather than policy as the competition between policy goals increases (Frey, 2010a: 255). The same basic dynamic is also observed in the present study when comparing the NFE case, on one hand, and the CO_2 and stem cell cases, on the other. Moreover, Frey's (2010a: 267) observation that the occurrence of parliamentary argumentation referring to evidence requires a certain level of conflict matches similar observations regarding the NFE and stem cell cases. Parliament showed very little interest in the evidentiary foundation of the NFE reform, while extensively arguing about legal and biomedical facts pertaining to stem cell research.

This leaves the question to what extent the findings of this study may be generalized beyond the Swiss context. As I have argued in the introductory chapter (section 1.3), Switzerland was not chosen as the empirical site for this research because its political and advisory system display particular, theoretically relevant, traits; rather, in the absence of a cross-country comparative heuristic, Switzerland represents one among other possible candidates for theory building. However, through theory development I came to identify specific traits of an advisory system, including supply side elements (i.e. control over access to scientific expertise) as well as the primary arena of expertise mobilization for social coordination (subsystem vs.

public). As I demonstrated, control over expertise mobilization in Switzerland is strongly concentrated, while at the same time being a feature of the coordinative discourse in the policy subsystem. The most straightforward means of assessing the validity of these advisory system-related effects involves choosing another country, similar to Switzerland regarding these two dimensions of the advisory system, for comparison. Assuming that such a similar case does exist, the next step would then be to look at a case study similar in problem structure to the ones I analyzed. Should there be no similar case – and I am not aware of another country matching the Swiss lack of pluralism in expertise control – the validity of the theory as a whole would have to be assessed (though not the robustness of the findings). Such an assessment, however, exceeds the available resources of this dissertation project and will have to be addressed within the framework of future research. Thus, whether or not the research findings can be generalized beyond Switzerland remains an open question.

9.4 Implications of the findings

In the light of these findings, can we maintain that there are right and wrong uses of expertise in policy formulation? Moreover, do these findings lend support for the view that proffered advice is only inadequately considered? My answer requires some qualifications. For instance, it has to be assumed that the supply of expertise is capable of meeting demand. While I have not conducted a structured assessment of whether this is the case in Switzerland, it transpired from the case studies that, owing to the country's small size, supply is limited and, if not provided by consultancy firms, strongly relies on academics' intrinsic motivation to engage with practical issues. Further, we have to keep in mind that policy advice is only one pathway by which science comes to bear on society. The limiting factor is not necessarily the effectiveness of advisory processes, because scientific advice can only be as effective as the policies it inspires (Mayntz, 1994) and such policies need to be adopted in the first place in order to have an effect (Knott and Wildavsky, 1980). Based on these qualifications and on my findings, I contend that an efficiency perspective on scientific expertise in policy formulation is misconceived. The fact that advisory de-

mand is a necessary but never sufficient factor in accounting for any kind of outcome makes it necessary to adopt a broader view, reaching beyond the design of 'interfaces' and other advisory instruments to include structuring elements of the policy subsystem in question. Such political contextualization requires a good amount of tacit knowledge about politics. I further contend that talking about knowledge utilization is inadequate as a descriptor because it stipulates that expertise seeking and its outcome is a deterministic coupling. Instead, I suggest that talking about the *valuation* of expertise better reflects such processes, especially since values require context. Finally, we need to keep in mind that, even if valued, scientific expertise is no substitute for politics when a consensus about the common good is missing. These are lessons of special relevance to institutionalized expert committees, who are well advised in developing strategies for the political contextualization of their work.

For an assessment of whether or not the findings of this study have implications for democratic accountability, we need to separate it from the more general phenomenon of policy formulation in venues with little democratic accountability, driven by internationalization and multi-level governance. It is further important to remember that this study looked only at policy formulation and not implementation. All things being equal, this study has therefore produced no evidence that the mobilization of expertise made policy formulation processes less accountable. Experts consistently played 'second fiddle' as they never acquired decision-making power during policy formulation. They closely collaborated with federal agencies, but were always kept at arm's length. While this also applies to the stem cell case, it was somewhat paradoxical that the government's public engagement initiative resulted in a highly professionalized discourse. But this 'capture' seems to have been the specific effect of science policy, and not of expertise mobilization as such.

That experts played second fiddle in the analyzed decision-making processes may, in fact, be used as a more general descriptor for the position of scientific expertise in the contemporary Swiss political system. Today, experts have less direct power than during the 1970s, and the cost of dissent is higher. The weakening of the informal core and the professionalization of the (short term) advisory system leads to a shift from advice provided through what I termed the 'network' to that

provided by the 'mandate' pillar. Any advisory mandate delivered through the latter has less autonomy, as it is delivered under a procurement contract controlled in the vast majority of cases by the federal administration. Moreover, as expertise production becomes professionalized, it has to be economically viable for commercial providers and academics alike. Consequently, alienating the federal administration through dissent is risky in a system with a monopolistic demand structure.

Playing second fiddle also has implications for research on Swiss politics, which should be sensitive to the fact that the political influence of experts is increasingly mediated by the federal administration. A practical consequence of this is that, when assessing the influence of a provider such as the consultancy firm Prognos, peer reputation as a measurement proxy for influence (used in studies employing social network analysis (e.g. Fischer, 2012; Ingold, 2008; Ingold and Varone, 2012)) likely induces a bias by neglecting the mediating role of the federal administration.

While the position of scientific expertise in the Swiss political system is, from an accountability perspective, rather unproblematic, it is debatable whether the strong control of the federal administration on scientific expertise is desirable. That political parties and Parliament are endowed with few resources to access scientific expertise is the result of political preferences. Nevertheless, a renewed political debate about the desirability of the *status quo* and the limits of the 'militia' system in the face of complex issues is not unwarranted by this research. This *status quo* also affects independent advisory bodies, such as NACBE, TA-Swiss, and OcCC. The case studies demonstrated that, in comparison to interest groups, such independent advisory bodies are not in a privileged position in terms of institutional access. They have to rely on informal mechanisms in order to be heard in the competition for the scarce attentions of political decision-makers. At first sight it may seem like a good solution to follow the Dutch example, where the provision of scientific expertise is concentrated in a very small number of institutions, all with strong constitutional prerogatives that grant them access to venues of policy formulation. But an indispensable condition for the Dutch system is a matching political culture, which sustains the authority of advisory institutions in public (Bijker et al., 2009; den Butter, 2011). In Switzerland there is little reason to believe that concentrating expertise providers into a small number of institutes would receive broad support. More-

over, as evidence about public trust in science suggests, it is unlikely that a political culture interested in underwriting extended constitutional prerogatives for such an integrated advisory body exists in Switzerland.

9.5 Appraisal of the theoretical approach

This study has provided a wealth of empirical insights about the role of scientific expertise in Swiss decision-making. It thereby contributes to closing the knowledge gap on contemporary science–policy relations in Switzerland. More broadly, it also makes contributions to wider understanding of Swiss politics. As outlined, these insights may also be of relevance for practitioners engaged in mandating and producing scientific expertise. This study also makes some theoretical contributions, which attempt to improve on existing theorizations of the role of scientific expertise in public policy.

The key to these theoretical contributions is the combination of actor-centered institutionalism (ACI), the problem governance approach (PGA), and discursive institutionalism (DI). The common denominator that holds these three theoretical foundations together is the assumption that a social rationality is an intrinsic part of action motives in political action situations. This is expressed in ACI through the notions of interaction orientation, while the PGA postulates that actors are not only sensitive to interaction dynamics, but also to how their principals perceive them. The concept of legitimacy, which is central to DI, is the most explicit expression of social rationality that political theory has to offer.

Each of these theoretical foundations is complementary to the others. ACI is an ontological framework, not a theory. It does not offer empirical propositions about scientific expertise in political action situations. Instead, it provides the conceptual basis for identifying expertise as an action resource, it enables the description of the theoretical mechanism linking this resource to commitments in the policy arena, and it allows for the development of a political economy of expertise distribution. The fact that the PGA is an actual theory with concrete propositions makes it a valuable complement to ACI, especially with regard to the concept of action situation. This concept is a rather generic construct in ACI, and the notion of problem struc-

tures in the PGA – together with the participatory dynamics they engender – constitutes a significant improvement. Conversely, ACI and DI offer the means for the consideration of structure, which the PGA, with its pluralistic outlook, is missing. By taking into consideration the contingent effects of institutions, the theory can be situated in particular national contexts, which enables us to think about advisory regimes in a comparative manner.

The ensuing theoretical framework improves on the other frameworks reviewed in two areas. Firstly, it offers the means to make the institutional and cultural contexts that scientific expertise is embedded in explicit. This not only enables showing how the institutional allocation of access to expertise and the distribution of power in a political system affect expertise mobilization. More importantly, it offers an avenue for analytically informed comparative study across different countries, which represents one of the biggest gaps in the literature on scientific expertise. This is a theoretical claim, for this study has merely provided the tools, and has not itself embarked on a cross-country comparison. But, even if studying a single national context, thinking comparatively forces the clarification of taken for granted assumptions about the political context that one studies.

Secondly, this study's assumptions concerning science and scientific expertise are inspired by contemporary social scientific understanding about science and its relationship to wider society, and not by a prescriptive philosophical account (i.e. positivism). Such an account emphasizes the social transactions inherent in the valuation of the cognitive product of science. Facts do not speak for themselves, and cannot be made to speak for somebody's cause without simultaneously invoking the social arrangement that bestowed them with credibility. Much past scholarship, inspired by the KU literature, ignores this social dimension, preferring instead to construe knowledge utilization in cognitive terms alone. This enables an (explicit or implicit) distinction between proper and improper knowledge use. This, in my opinion, is inappropriate, as it fails to recognize that knowledge use can only ever be instrumental in the pursuit of political objectives. Consequently, the roles that scientific expertise enacts in the policy arena are not the product of deliberate agency on the part of an individual, but of interaction dynamics. Recognizing this not only improves analysis, but also helps to remediate against a scientistic misrepresenta-

tion of science in politics that continues to circulate within the scientific community.

This theoretical framework has also blind spots, most notably with regard to the internationalization of policy problems – for instance in the case of trans-boundary pollution – and associated expertise. Internationalization does not only engender power shifts among domestic actors (as discussed earlier with reference to Switzerland), changing how a political system works, it also engenders very interesting questions about the supply of expertise. For instance, how does the internationalization of expertise affect the domestic economy of expertise supply and demand? Are there different resource requirements to access expertise located outside one's political system compared to domestic sources? And how does the bigger social distance between producer and user affect the economy of credibility? These are all relevant questions that future inquiry should engage with.

This opening toward future research possibilities concludes this thesis. While much remains to be said on the topic, and many empirical aspects have been left unexplored, this research was nonetheless able to empirically substantiate a clear message: we should not judge scientific expertise based on abstract cultural notions of rationality, for this will inevitably invite disappointment. Instead, we must come to recognize it for what it is, and to understand what can be realistically expected of it. This, and only this, provides fertile ground for effectively harnessing the power of science for social problem solving.

A

Data Sources

A.1 Const. Art. 119

Constitutional Article 119 was called Const. Art. 24^{novies} prior to the overhaul of the constitution in 2000. It is titled "Reproductive medicine and gene technology involving human beings" and states that:

1. Human beings shall be protected against the misuse of reproductive medicine and gene technology.
2. The Confederation shall legislate on the use of human reproductive and genetic material. In doing so, it shall ensure the protection of human dignity, privacy and the family and shall adhere in particular to the following principles:

    a) all forms of cloning and interference with the genetic material of human reproductive cells and embryos are unlawful.
    b) non-human reproductive and genetic material may neither be introduced into nor combined with human reproductive material.
    c) the procedure for medically-assisted reproduction may be used only if infertility or the risk of transmitting a serious illness cannot otherwise be overcome, but not in order to conceive a child with specific characteristics or to further research; the fertilisation of human egg cells outside a woman's body is permitted only under the conditions laid down by the law; no more human egg cells may be developed into embryos outside a woman's body than are capable of being immediately implanted into her.
    d) the donation of embryos and all forms of surrogate motherhood are unlawful.
    e) the trade in human reproductive material and in products obtained from embryos is prohibited.
    f) the genetic material of a person may be analysed, registered or made public only with the consent of the person concerned or if the law so provides.
    g) every person shall have access to data relating to their ancestry.

A.2 List of interviews and archives

Table A.1: Place, date, and duration of interviews

Id	Location	Date	Duration
I	Lausanne	13/04/2011	02:30:00
II	Basel	25/03/2011	01:40:00
III	Genève	28/02/2011	01:30:00
IV	Bern	23/03/2011	01:40:00
V	Lausanne	05/09/2011	01:35:00
VI	Genève	18/07/2011	02:30:00
VII	Bern	11/03/2011	01:30:00
VIII	Bern	05/04/2011	01:15:00
IX	Zürich	21/03/2011	00:55:00
X	Luzern	20/05/2011	02:00:00
XI	Bern	25/03/2011	01:45:00
XII	Bern	09/05/2011	01:00:00
XIII	Bern	20/06/2011	02:45:00
XIV	Bern	06/07/2011	02:30:00
XV	Zürich	14/07/2011	01:30:00
XVI	Itingen	15/06/2011	01:30:00
XVII	Herrenschwanden	08/08/2011	01:15:00
XVIII	Phone	08/08/2011	00:10:00
XIX	Basel	10/08/2011	01:20:00
XX	Ottenbach	11/08/2011	01:30:00
XXI	Horgen	16/08/2011	02:00:00
XXII	Pfäffikon SZ	18/08/2011	01:10:00
XXIII	Bern	22/08/2011	01:40:00
XXIV	Bern	23/08/2011	01:15:00
XXV	Bern	25/08/2011	01:50:00
XXVI	Bern	05/09/2011	01:20:00
XXVII	Basel	07/09/2011	02:15:00
XXVIII	Bern	23/07/2010	01:30:00
XXIX	Zürich	03/08/2010	01:00:00
XXX	Zürich	13/08/2010	01:10:00
XXXI	Zug	13/08/2010	01:15:00
XXXII	Bern	17/08/2010	01:30:00
XXXIII	Basel	17/08/2010	02:00:00
XXXIV	Bern	19/08/2010	01:10:00
XXXV	Bern	20/08/2010	01:00:00
XXXVI	Bern	24/08/2010	01:30:00
XXXVII	Ittingen	25/08/2010	01:30:00
XXXVIII	Bern	26/08/2010	01:10:00
XXXIX	Bern	15/09/2010	01:15:00
XL	Neuchâtel	08/12/2010	01:15:00
XLI	Bern	15/12/2010	01:30:00
XLII	Lausanne	28/08/2010	01:24:00

Table A.2: Source list of archival records with citation format

Name	Description	Location	Sample citation
Bundesblatt	Proceedings of federal decision-making	http://www.admin.ch/bundesrecht/00568/index.html?lang=de	BBl *1998* 4363
Amtliches Bulletin	Proceedings of parliamentary deliberation	http://www.parlament.ch/ab/frameset/d/index.htm	AB *2003* N 1351
Curia Vista	Database of parliamentary proceedings	http://www.parlament.ch/e/dokumentation/curia-vista/Pages/default.aspx	[Curia Vista] 02.427
Systematische Rechtssammlung	Compilation of enacted federal law	http://www.admin.ch/bundesrecht/00566/index.html?lang=en	SR 101
Bundesarchiv	Federal archives	https://www.swiss-archives.ch	[BAR] E4114A 2004/75 BD 376
FOEN archive	Records on CO_2 act	FOEN, Ittingen	n/a

B

Methodology

B.1 Interview topic guide

Table B.1: Interview topic guide (extended version)

Topics	P	A	E
I. Introduction • Introduction of interviewer • Presentation of research • Explanation of the interview procedure • Permission to record/confidentiality	×	×	×
II. Background of interviewee • Professional background • Relationship to decision-making process – Personal role – Beginning of engagement – Reasons for engagement (identification of issues of personal or professional importance for the interviewee in regards to the decision-making process)	×	×	×
III. Preparation process • Personal preparation of the interviewee – Consultation of documents? What kind of documentation, obtained how? – Presentation of a list of advisory reports in relation to the issue. Which ones has the interviewee heard of, seen, or studied? – Consultation of specialists? Whom? Why trust this person? – Presentation of names of expert advisers. Whom is the interviewee aware of or has talked to? • Preparation of the political party or group the interviewee is member of – At what point did the political party/group pick up on the issue? – Organization of special events like hearings or retreats? – Who has been invited to such a hearing? – Special division of labor in the parliamentary group?	×		

Continued on next page

Table B.1 – continued from previous page

Topics	P	A	E
IV. Organization of policy work during the pre-parliamentary phase • Organization of drafting process (intra or inter-agency team, participation of people external to the federal administration?) • Identification of participants in the drafting process • Authoring process of the dispatch • Formal and informal consultation process		×	
V. Consultation of extra-mural science-based policy advice during the pre-parliamentary phase • Intramural expertise on the issue, does it exist, to what extent, is it judged to have been substantially sufficient? • Consultation of extra-mural science-based advice – Itemization of the different occurrences of external advice – Timing of advice in relation to policy work – Occurrence of uninvited advice – Judgement about rationales behind contracting external advice and its timing • Organization of extramural advice – Criteria for selecting of individual experts or advisory organizations (academic or commercial) – Previous history of collaboration between agency and expert/advisory organization – Characterization of the expert pool in the policy domain • Management of expert mandates – Formulation of research questions – Monitoring and quality assurance of advisory mandate – Autonomy of the expert – Timeframe and budget of an advisory mandate – Place and time of result publication and general publication practices		×	×
VI. Hearings in parliamentary subcommittees • Rationales for conducting hearings • How are hearings organized • Who is invited to testify in a hearing? • Identification strategies of relevant experts by the committee • Subjective evaluation of in what way and in relation to which issues hearings are useful	×	×	×
VII. Policy deliberation in the parliamentary subcommittee • Perception and role of the delegation from the federal administration during committee deliberation • Importance of ideological orientation of experts or civil servants for the assessment of their work • Rationales for mandating the administration to compile additional reports	×	×	

Continued on next page

Table B.1 – continued from previous page

Topics	P	A	E
VIII. Production of science based-advice			×
• Media relations of advisers			
• Individual experts			
– Motivation			
– Required skills and professional biography as an adviser			
– Autonomy and expected behavior: dos and don'ts			
• Institutionalized advisory bodies			
– Remit and addressee of advice			
– Kind of institutional organization of advisory body and legal foundation			
– Recruitment of members			
– Formal relationship to the princial			
– Operational rules and practice of advice production			
IX. Politics of expertise		×	×
• Process of establishing a new advisory organization			
• Selection process of members for advisory organizations			
• Context of advice. Are there transformations in time?			
– Tender requirements			
– Transparency			
X. Perception of expert advice	×	×	×
• What is expected of an expert adviser?			
• Strategies of assessing the credibility of an expert			
• Ideological orientation and objectivity			
• Conception of the role of science in society			
XI. Conclusion	×	×	×
• Recapitulation of key points			
• Invitation of the interviewee to address issues perceived as relevant and important but not touched upon during the interview			
• Trailing off conversation, usually off-record			

B.2 Carrying out the interviews

Switzerland's small size affords easy accessibility to its political elite. Locating and contacting people by letter, email, and a follow up phone call was straightforward. Only in two cases was I unable to locate somebody. Further, only seven people declined to be interviewed because of time constraints or because they declared to no longer recalling events sufficiently well. All interviews took place between July 2010 and September 2011 in locations like cafés, offices, or interviewees' homes. An average interview took 1 hour and 30 minutes, the shortest 55 minutes, and the longest 2 hours and 45 minutes.

Extensive preparation preceded each interview. I acquainted myself with the interviewee's person and the organization he or she represented in the policy process through internet and newspaper archive searches. Moreover, the compilation of an event timeline and of attendance lists to these events lent me an approximate picture of the interviewee's role in the decision-making process and the scope of events he or she might be familiar with. In addition, the study of meeting minutes and policy reports ensured that I had a solid understanding of the policy issue at stake.

Several reasons necessitated such extensive preparation. Firstly, demonstrating a solid knowledge of the actors, policy instruments, and context of a particular policy issue was important for leveraging my personal authority. Asserting competence in such a way was helpful in bridging the asymmetries of age and personal authority that shaped the interaction situations,[1] and favored trust building. Secondly, since the interview neither followed closed questions nor a fixed succession of topics, having developed a mental map of the issue made it easier to allow for such a structure and to refocus the discussion should it have strayed off topic or to revisit a particular point of it. Thirdly, I could provide elements of context to the interviewees (names, dates, etc.) which helped them to remember specific things, or conversely, to detect inconsistencies which could then be directly addressed.

Every interviewee consented to the recording of the conversation. This allowed for fully focusing on the conversation and produced better data than note taking. I informed the interviewees that their identity is protected by assuring exclusive use of the audio recording and the associated transcript for my own research only. Moreover, I agreed not to publish their names or quote them in an identifiable way. The latter constitutes a challenge due to the small size of the Swiss political elite. In some instances, this forces me to omit an interview identifier or to refer to interview data in a vague way. But only few discussed issues were of sensitive or 'off the record' nature. One interviewee declared to only sharing generic impressions in order not to jeopardize ongoing work. But mostly people were only reluctant to name persons or organizations they negatively referred to.

All interviews were conducted in the native tongue of the interviewee, which was for the most part Swiss German (also my native tongue). Alternatively, either French or standard German was spoken.

[1] As a 29 year old PhD student without any prior experience in dealing with the Swiss political elite I was in no obvious position of authority. This is not to exclude that being interviewed is potentially stressful, too.

B.3 Analysis protocol

Chapter 4 has provided a description of the ontological assumptions and analytical steps underlying the empirics of this research. The aim of this section is to provide a more in-depth account of the analytical process that took place after the data was acquired and coded.

The actual analytical process started out with two empirical resources. Firstly, there was the database of events, which had been continuously fed during data collection and reduction. This database enabled the building of a timeline for each case that served as a chronological map. It provided information about concrete sequences of events, and allowed a preliminary grouping of these events according to their venues. Secondly, documentary records and interview testimony had been coded in such a way that substantially similar chunks of data could be grouped together, and thus to enable the identification of thematic clusters (section 4.4 describes the coding process).

This was the empirical basis for engaging in a first round of the building of an ontological inventory, also called a situational map, by laying out all the elements that appear in the data. In this first version, I collected and graphically represented these entities in an unordered state. These were then ordered according to a classification grid (cf. Clarke, 2005: 90), as follows:

- Individual human elements/actors: key individuals in the situation;
- Nonhuman elements/actants: technologies, infrastructure, knowledge;
- Collective human elements/actors: groups, organizations;
- Implicated/silent actors/actants;
- Discursive constructions of individual or collective human actors, as found in the situation;
- Discursive constructions of non-human actants;
- Political and economic elements: the state, particular industries, rule systems, parties, politicized issues;
- Sociocultural/symbolic elements: religion, race, gender, symbols, icons;
- Temporal elements: trajectories, moments of crisis;
- Spatial elements: geographical aspects, levels;
- Major issues and debates;
- Discourses related to but not originating in the situation.

Figure B.1 represents a working version of a situational map, taken from the analysis of the CO_2 Act case study. The utility of situational maps does not only relate to their inventory and classification functions (plotting timelines does much of this, too). Rather, it is the exploration of relationships between elements that brings focus to the analysis, as relationships become explicit and may be further examined. In a sense, making ontological inventories – as exemplified by the more formal technique of making situational maps – was an activity that was ongoing throughout the research process. During data collection and interviewing, in particular, a mental map emerged of well-known elements and their associations, and of gray areas that warranted further probing.

The key outcome of this construction of inventories of the entities present in a situation, and the ensuing exploration of their associations, was the identification of the artefacts of expertise mobilization (reports, discourses, people, organizations)

and the discovery of basic networks between these artefacts and other elements. This analytical step also led to the identification of other, previously overlooked, actors.

The most important analytical step was arguably the exploration of different actors' perspectives and commitments, and of the sites in which different actors encountered each other. Clarke (2005: 124ff.) understands social worlds/arena maps as a form of organizational analysis which aims to elucidate meaning making and the organization of commitments. Moreover, as a substitute for grounded theory's 'conditional matrix', such maps are can be used to uncover broader constraints, opportunities, and resources at the disposal of a particular social world.

I have not produced visual representations of actors and arenas, as is the convention in situational analysis. The policy process provides a highly structured environment, with clearly defined actors, arenas of interaction, and procedural rules; it was thus possible to proceed directly with writing memos about different actors' perspectives, having identified these actors from the raw data and from the production of situational maps. Moreover, I was especially interested in actors that were linked to artefacts of expertise mobilization. For this process of memo writing, the questions suggested by Clarke (2005: 115) regarding social worlds/arena maps were particularly helpful in structuring analysis:

- What is the work of each world?
- What are the commitments of a given world?
- How do its participants believe they should go about fulfilling them?
- How does the world describe itself – present itself – in its discourse(s)?
- How does it describe other worlds in the arena?
- What actions have been taken in the past and are anticipated in the future?
- How is the work of furthering that social world's agenda organized?
- What technologies are used and implicated?
- Are there particular sites where the action is organized? What are they like?
- What else seems important about this social world?

The same memo writing process also applies to the arena itself, for which Clarke (2005: 115) also proposes a list of questions:

- What is the focus of this arena?
- What social worlds are present and active?
- What social worlds are present and implicated or not present and implicated?
- Are there any worlds absent that you might have expected?
- What are the hot issues/contested topics/current controversies in the arena's discourses?
- Are there any surprising silences in the discourse?
- What else seems important about this arena?

It was these memos concerning actors and arenas of interaction that eventually became the basic narrative structure for the case study chapters. In most cases, I limited the description of actors' perspectives to those who acted as a principal of expertise mobilization.

The final focus of the situational analysis framework consists of positional maps. A positional map is the laying out of those positions taken and *not* taken with regard to the salient issues in an arena. It thus requires the identification of salient, but not

necessarily conflictual, issues. Each issue then becomes a dimension of a space in which positions are located (Clarke, 2005: 128). The distinctive character of positional maps in situational analysis is that positions are not necessarily associated with 'a knowing subject', such as a person or organization. Instead, Clarke (2005: 126) defines them as a 'position in discourse'. There are two reasons for severing the link between subjects and discursive positions (though note that such a link may be established at a later point in the analysis). First, actors can hold multiple and even contradictory positions. A straightforward representational account of actors and their positions risks ignoring this ambiguity, which may in fact be highly relevant in understanding meaning making. Second, linking positions to actors only allows for the representation of those positions that were actually taken: those that were not articulated are invisible. Such silent positions may or may not matter, but there may be an analytically important reason for their absence from the action situation. Clarke (2005: 136) attaches especial importance to the latter point.

Figure B.2 is a stylized version of a positional map. My observation has been that deliberation in Parliament produces the most clearly articulated version of the different discourses present within an action situation. Identifying them, and then tracing them back in time, has been a useful technique for exploring their origins and construction processes. This has thus enabled me to reconstruct how expert arguments become woven into such discourses.

These tools for interrogating the data created the foundation for memos, which eventually turned into paragraphs and sections of the text. But analysis did not stop there. What had been written so far amounted to a reconstruction of selected aspects of action situations as they had been experienced *in situ*. It was on the basis of this reconstruction that more theoretically informed interpretations could be made. This took place at the end of each chapter, and in the concluding chapter of this thesis, which also offers a comparison of the cases.

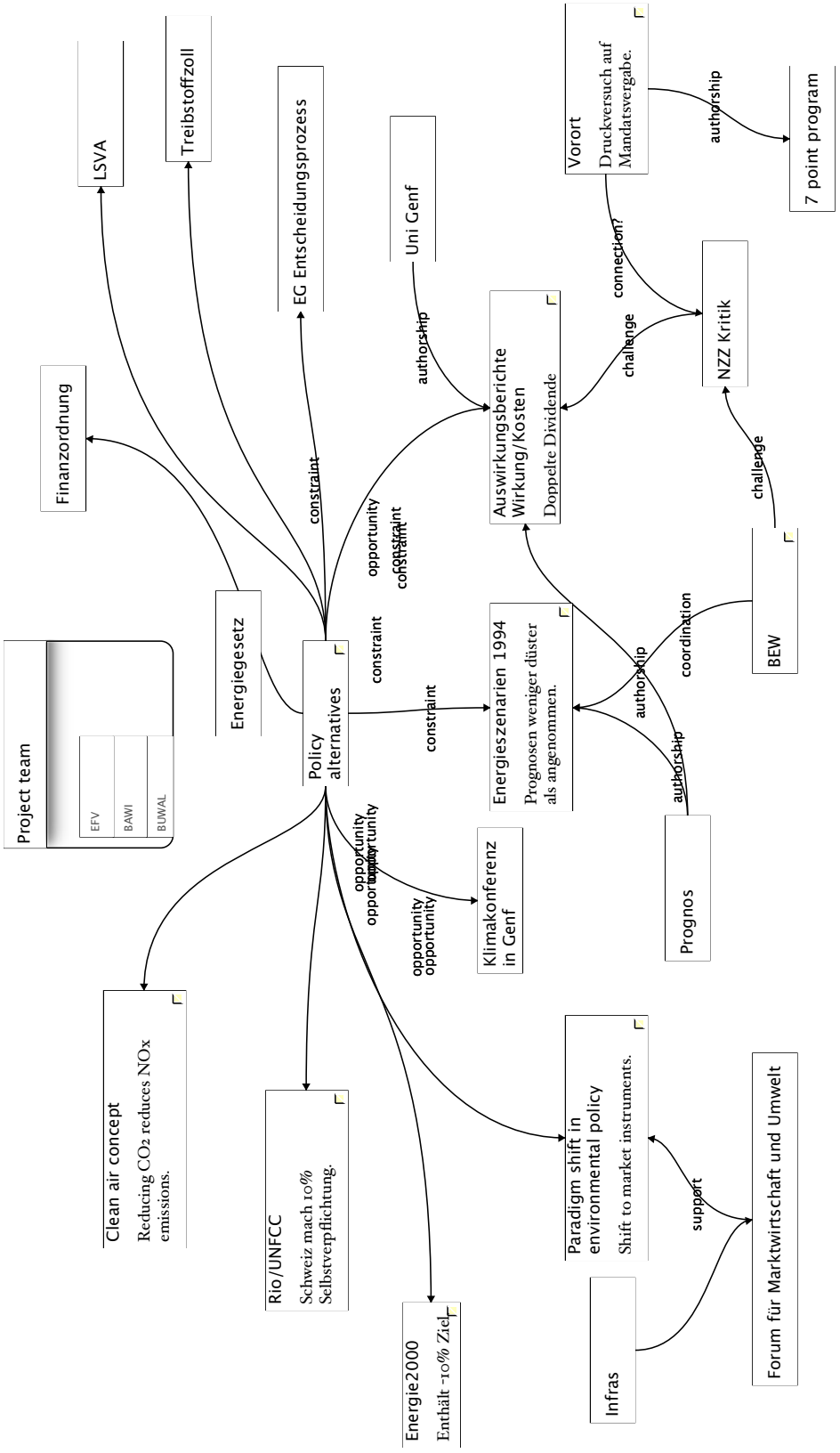

Figure B.1: Exemplar of a situational map regarding the pre-1995 period of policy work on the CO_2 Act.

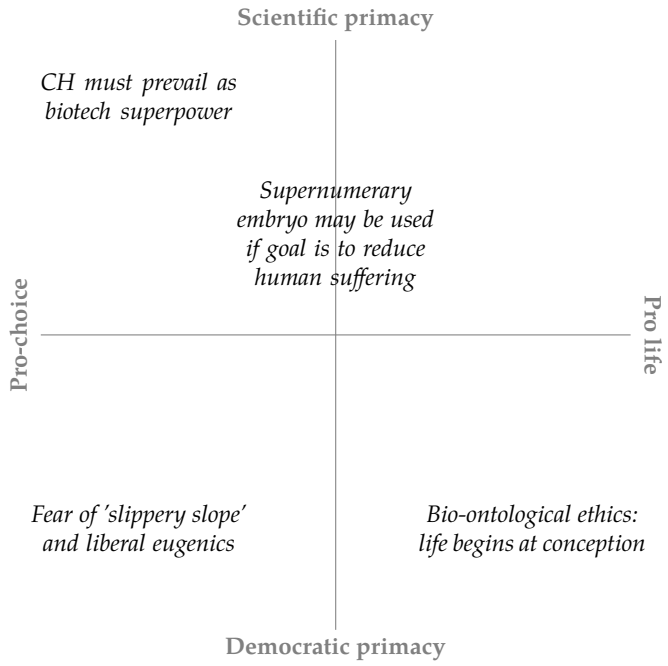

Figure B.2: Positional map from the case study on stem cell research regulation.

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