



NOTA DI LAVORO

70.2012

Bounded Rationality and Voting Decisions Exploring a 160-Year Period

By **David Stadelmann**, University of
Fribourg, Department of Economics,
CREMA—Center for Research in
Economics, Management and the Arts

Benno Torgler, School of Economics
and Finance, Queensland University of
Technology, EBS Universität für
Wirtschaft und Recht, EBS Business
School, CREMA—Center for Research in
Economics, Management and the Arts

Economy and Society

Series Editor: Giuseppe Sammarco

Bounded Rationality and Voting Decisions Exploring a 160-Year Period

By David Stadelmann, University of Fribourg, Department of Economics, CREMA—Center for Research in Economics, Management and the Arts

Benno Torgler, School of Economics and Finance, Queensland University of Technology, EBS Universität für Wirtschaft und Recht, EBS Business School, CREMA—Center for Research in Economics, Management and the Arts

Summary

Using a natural voting experiment in Switzerland that encompasses a 160-year period (1848–2009), we investigate whether a higher level of complexity leads to increased reliance on expert knowledge. We find that when more referenda are held on the same day, constituents are more likely to refer to parliamentary recommendations in making their decisions. This finding holds true even when we narrow our focus to referenda with a relatively lower voter turnout on days on which more than one referendum was held. We also show that when constituents face a higher level of complexity, they listen to parliament rather than interest groups.

Keywords: Bounded Rationality, Voting, Referenda Attention, Rules of Thumb

JEL Classification: D03, D72, D83, H70

We thank Marco Portmann for very helpful comments.

Address for correspondence:

David Stadelmann
University of Fribourg
Department of Economics
Bd. de Pérolles 90
1700 Fribourg,
Switzerland
E-mail: david.stadelmann@unifr.ch

Bounded Rationality and Voting Decisions Exploring a 160-Year Period

David Stadelmann and Benno Torgler*

July 23, 2012

Abstract: Using a natural voting experiment in Switzerland that encompasses a 160-year period (1848–2009), we investigate whether a higher level of complexity leads to increased reliance on expert knowledge. We find that when more referenda are held on the same day, constituents are more likely to refer to parliamentary recommendations in making their decisions. This finding holds true even when we narrow our focus to referenda with a relatively lower voter turnout on days on which more than one referendum was held. We also show that when constituents face a higher level of complexity, they listen to parliament rather than interest groups.

Keywords: Bounded rationality, voting, referenda attention, rules of thumb

JEL Classification: D03, D72, D83, H70

* David Stadelmann, University of Fribourg, Department of Economics, Bd. de Pérolles 90, 1700 Fribourg, Switzerland, david.stadelmann@unifr.ch. Benno Torgler, School of Economics and Finance, Queensland University of Technology, GPO Box 2434, Brisbane, QLD 4001, Australia, and EBS Universität für Wirtschaft und Recht, EBS Business School, Rheingaustraße 1, 65375 Oestrich-Winkel, Germany, benno.torgler@qut.edu.au. Both are also affiliated with CREMA—Center for Research in Economics, Management and the Arts, Switzerland. We thank Marco Portmann for very helpful comments.

Viewed as a geometric figure, the ant's path is irregular, complex, hard to describe. But its complexity is really a complexity in the surface of the beach, not a complexity in the ant.

(Herbert A. Simon 1957, p. 51)

When many problems demand concentrated attention at once—and this is always happening in modern industrial society—reliance on the expert specialist is the only resource.

(John Maurice Clark 1918, p. 28)

I. INTRODUCTION

As part of its recently revived commitment to *correctly* describing or prescribing human economic affairs, economics has been aiming to achieve a single, widely-accepted, and precise behavioral theory of choice. Simultaneously, there has been an increased interest in economics in working with the idea that human rationality is bounded and thus theories building around more realistic models of human actors. As pointed out by Herbert Simon, a pioneer of this concept (Simon 1955, 1956), the idea that human rationality is bounded by limitations has persisted from classical until modern times. Simon (2000), for example, cites Voltaire's statement in his *Dictionnaire Philosophique* that "the best is the enemy of the good" and points out that "in modern translation: 'optimizing is the enemy of satisficing'"¹ (p. 26). In earlier work, Simon (1957) defines the principle of bounded rationality as follows: "The capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behavior in the real world—or even for a reasonable approximation to such objective rationality" (p. 158).

Almost a century ago, John Maurice Clark (1918) (son of John Bates Clark) put forward interesting ideas about decision-making that are consistent with the concept of bounded rationality and satisfaction. Most particularly, Clark stresses that decision making involves an attention effort that cannot be sustained for long time because of limited cognitive capacity. He links his discussion to works like Cooley's *Human Nature and Social Order*, which refers to the human tendency toward "protecting ourselves by some sort of mechanical control—

¹ Simon (1957) coined the term "satisficing" replacing it with the goal of maximizing through finding strategies or actions that are good enough. He argues that "organisms adapt well enough to 'satisfice'; they do not, in general, 'optimize'" (Simon 1956, p. 129).

some accepted personal authority, some local custom, some professional tradition, or the like. Indeed, to know where and how to narrow the activity of the will in order to preserve its tone and vigor for its most essential functions, is a great part of knowing how to live. An incontinent exercise of choice wears people out, so that many break down and yield even essentials to discipline and authority” (as cited in Clark 1918, p. 23). Clark also stresses that a “good hedonist would stop calculating when it seemed likely to involve more trouble than it was worth, and, as he could not in the nature of the case tell just when this point has been reached, he would make no claim to exactness for his results” (p. 25).

Clark’s observations describe the avenue of our endeavor: to investigate whether a higher level of complexity leads to an increased reliance on simple rules of thumb. Specifically, we explore whether humans rely on the expert specialist as a rule of thumb when many problems demand concentrated attention simultaneously, a topic on which, to our surprise, there is little empirical evidence. A valid identification of whether humans follow rules of thumb as a consequence of bounded rationality requires that (1) the variable employed in their decisions is objectively measurable, (2) the decision itself is simple (ideally dichotomous), inexpensive and frequently repeated, and (3) the rule is applied in a complex environment. We study a natural experiment in voting across a period of 160 years (1848–2009) which fulfills all these requirements.

In Switzerland—whose institutional environment has been stable since 1848—we analyze constituent voting behavior using parliament as the expert specialist. We assume this perception of expertise because in most modern democracies, the set of experts to which the division of labor delegates the information-provider function includes politicians, interest groups, the government, and/or professional information gatherers (Downs 1957). This assumption is further supported by Grönlund and Setälä’s (2007) analysis of European Social Survey (2002–2003) data, which finds that citizens in the Nordic countries, Switzerland, and Luxembourg report the highest levels of trust in their national parliaments and have the highest level of overall trust in political institutions. We therefore assume that parliament, as a collective source of wisdom, may be more credible than a single politician. Citizens acquire political information to help them decide how to vote. In Switzerland, the parliament always offers an *ex ante* voting recommendation for referenda, a standard method of information provision that enhances its image as expert consultant. We identify the effect of these public parliamentary voting recommendations on constituents’ *real choices* (i.e., the revealed preferences of both the constituents and parliament). Such voting decisions are influenced by the actions of leaders, who provide help through informing voters about the issues (Shachar

and Nalebuff 1999). Thus, the variable employed in the decision, i.e. parliament's recommendation, is observable and measurable. Moreover, referendum decisions represent constituents with dichotomous choices which are inexpensive and frequently repeated adding up to a total of 555 voting decisions thereby fulfilling a further central requirement of a valid identification of the use of rules of thumb.

Most particularly, we use two ways of identifying complexity comparable to an experimental setting that demands concentrated attention on several simple issues simultaneously. First, to ensure careful selection of theoretically relevant behavior measures, in constructing our dataset, we recognize that although parliament may always influence constituent decision making somewhat, from our theoretical perspective, this influence is likely to be larger when the number of referenda is higher than one, i.e. the rule of thumb is more frequently used when more referenda are held. In Switzerland specifically, every referendum is preceded by an open public discussion; however, such discussion is easier for constituents to follow if they need only decide on a single issue and their attention is not divided between two or more issues on the same day. Our setting allows us to distinguish between days on which there is only one referendum and days on which two or more referenda take place. If constituents follow a rule of thumb, we predict that when more referenda are held on the same day, they will be more likely to refer to outside recommendations in their decision-making. We therefore use the number of referenda per day as a first measure of complexity to identify parliamentary influence on constituents' choices.

Second, to further pinpoint this influence, determine whether constituents are bounded in their rationality and therefore employ rules of thumb, we focus only on days with two or more referenda. Because of systematic voter registration in Switzerland since 1884, we know the number of voters and also the number of valid votes in referenda. We therefore know how high the turnout was for all referenda on the very same day. As constituents incur the same costs for turning up for the first referendum as for the second or third on the same day, we can use differences in turnout within constituencies to identify which referendum on a given day attracted the most attention. In particular, because even individuals that go to the polls do not necessarily vote on all ballot issues (Crain, Leavens, and Abbot 1987), we identify the referendum with the highest turnout of the day. Recognizing that constituents are more likely to cast a vote for a referendum about which they are better informed, while some with little information may still vote but rely more on parliamentary recommendation, we identify the parliamentary influence by focusing on referenda with a relatively lower turnout on days on

which more than one referendum was held. The strength of this empirical design is that we can use the percentage of voter turnout to directly identify the voters' focus of attention.

The article proceeds as follows: the next section provides a deeper discussion of this methodology. Section III describes the data setting and identification strategy. Section IV presents the empirical results, and Section V concludes.

II. BOUNDED RATIONALITY

Economists' increasing interest in bounded rationality is reflected in the fact that 44% of the 825 articles published on this topic between 1996 and 2012 appear in economics journals.² Moreover, there has been also been an increased interest in economics in working with theories of more realistic models of human behavior that in Simon's (2000) words "avoid over-simplification where it makes a consequential difference" (p. 30). Most particularly, Simon (1992) claims that "to omit from economic theory a consideration of human computational power is like omitting gravitational forces from astrophysical theory. In a weightless world, or one with gravity shields, things would be quite different from the way they are in the actual world. A theory for the former would have little predictive value in the latter" (p. 26).

The research agenda, therefore, is to go beyond Milton Friedman's (1953) assertion that a theory cannot be judged by the realism of its assumptions but only by its efficacy in making predictions.³ Neoclassical theory, Simon (1992) argues, is flawed in having no notable record of correct predictions and, even where success has been claimed, a paucity of comparisons with alternative theories.⁴ It is also unclear why unrealism is acceptable: "Among the inferences that can be drawn from any theory, hence among its predictions, is the truth of its assumptions. A theory can be falsified by falsifying its axioms as readily as it can be falsified by falsifying any of the theorems that can be derived from the axioms. There is no support in any system of logic with which I am familiar, or in any school of philosophy of science, for Friedman's principle of unrealism" (p. 36). Friedman's error, Simon contends, may be attributed to confusion between unrealism and approximation, a confusion he illustrates using

² ISI Web of Knowledge on March 30 (2012).

³ See also Conlisk (1996) for a discussion of prominent arguments in favour of unbounded rationality.

⁴ In their eye-tracking study, Reutskaja et al. (2011) use an experimental design that is comparable to consumer decisions in a modern supermarket. This design allows comparison of the efficacy of three alternative dynamic search models: an optimal dynamic search with zero search costs, a satisficing model, and a hybrid model in which subjects search for a random amount of time dependent on the value of the goods seen and make the "best" choice. They conclude that the hybrid model performs best.

Friedman's example of Galileo neglecting air resistance when stating the law of falling bodies: "... air resistance can be ignored when studying the fall of bodies in a near-vacuum, but not when designing parachutes. And in no case does a theory of approximation support the principle of unrealism, that it doesn't matter if the premises of a theory are false. Unrealism is no virtue, and unless careful attention is given to the goodness of approximation that is required, it can be fatal" (p. 37).

It is therefore not surprising that bounded rationality has become more dominant in recent years. For example, in a revised version of the Nobel lecture delivered in Stockholm on December 8, 2002, Kahneman (2003) explains that his research team was attempting "to obtain a map of bounded rationality by exploring the systematic biases that separate the beliefs that people have and the choices assumed in rational-agent models" (p. 1449). Conlisk (1996) provides a nice overview of a large set of models that allow for bounded rationality. Baumol (2004), who attended the debate between Herbert Simon and Milton Friedman on the role of rational calculation in economic decisions, recalls the exchange: "Milton criticized that satisficing was just a form of camouflaged rationality, entailing a careful weighing of the costs of improved information and that of more sophisticated calculation, while Herb responded that this view dodged the substance of the issue, simply incorporating the one position into the other by terminological sleight of hand" (p. 58). These different lines of argument led to Baumol and Quandt's (1964) paper on the rationality of following rules of thumb, which leads to what they term "optimally imperfect decision making".

In the context of our paper, Simon (1986) claims that to "predict how a voter, even a voter motivated solely by concern for his or her economic well-being, will vote requires much more than assuming utility maximization... In any model of voting behavior that has any prospect of predicting behavior, almost all the action will lie in these auxiliary assumptions about attention and belief that define the decision maker's frame" (p. S217). Because our study analyzes the outcomes of different referenda on precisely the same day, we must take into account that people are endowed with a narrow capacity for simultaneous attention to different pieces of information (Simon 1983). In other words, humans can only deal with a limited number of problems at one time.

A key strength and advantage of our experimental context, therefore, is that we can observe the nature of the attention outcome using voter turnout over a very long period (160 years covering 555 referendum decisions) while still holding the setting (referenda) constant. While the changing shape of the decision-making environment may have influenced human goal-directed behavior over time (Simon 1996), our setting remains constant. Over the 160-

year sample period, for example, citizens have grown up in very different social environments, with different knowledge, information, and social norms. Nonetheless, the same basic decision making rule is applied in complex situations which points to the identification of a common invariant of human behavior in decision making. To the best of our knowledge, there are as yet no studies that explore bounded rationality in such a real world setting over such a long time span.

Our natural experiment, we believe, is very well specified to derive empirical insights on the *consequences* of bounded rationality. Using voter turnout, we can directly measure which issue received more attention and offer a clear explanatory heuristic for the decision process mechanism. The limits of attention stem from people's inability to think about lot of things at the same time (Simon 1983). We can thus provide an answer not only on *what* decisions are made but also *how* they are made, thereby offering empirical evidence on procedural rationality and contributing to empirical knowledge on decision processes. Simon (1996) refers to such heuristic searching as a selective search using rules of thumb to find decisions that satisfice (p. 27)⁵.

To obtain a clear picture of how people vote, we postulate a simple heuristic mechanism enforced through habit and rule-governed behavior, one that can potentially identify the invariants of human behavior, particularly over a very long time span. In such a changing environment, adaptive individuals faced with complexity are likely to apply the same simple decision-making rules and habits, i.e. the essence is limited computational capacity in complex or extensive decision environment rather than just scarcity of cost information (Hodgson 1997). However, whereas Hodgson (1997) sees the problem of handling large amounts of information in terms of the net cost of obtaining it, in our case, extensiveness is less of an issue because parliamentary recommendations are readily visible in a booklet/pamphlet sent to voters prior to a referendum. In other words, most of the information needed for decision making is simply placed into the voters' hands. On the other hand, complexity, which Hodgson defines as "the density of structural linkages and interactions between the parts of an interdependent system" (p. 669), is important for our study because individuals effectively have computational limitations when interpreting information received (Simon 1990). In fact, complexity in the cost function or other environmental constraints can be so great that bounded rationality becomes important as actors fail to calculate the best course of action (Simon 1972).

⁵ For a detailed discussion on heuristics see Gigerenzer et al. (2011).

The challenge, therefore, lies in analyzing and using the information. Because the process of satisficing uses experience to construct an expectation of solution goodness (Simon 1990), while habit formation internalizes the decision process as an invariant of human behavior, introducing a model of satisficing behavior can greatly enhance understanding of how a decision or equilibrium is reached (Simon 1959).

We, in line with Clark (1918), argue that complexity produces a rule of thumb that constituents are more likely to follow parliamentary recommendations because parliament, being elected by constituents, is supposed to represent them and could be seen as experts. Voters may also believe that (in the aggregate) politicians and parliament as a whole act in the public's best interest. Hence, a rule of thumb that says "follow the recommendation of the parliament when complexity increases" is comprehensible. It also conforms to Simon's (1996) argument that "we should not look for great complexity in the laws governing human behavior, in situations where the behavior is truly simple and only its environment is complex" (p. 68). In fact, our setting conforms to the central characteristics of a rule of thumb (see Baumol and Quandt 1964, p. 24). First, the variable employed in the decision—whether or not to follow parliaments' suggestion—is objectively measurable. Second, the decision is simple, inexpensive, and well suited to frequent repetition (i.e., frequent referenda among constituents). We therefore argue that when faced with information difficulties (a complex environment), constituents apply a simple decision-making rule.

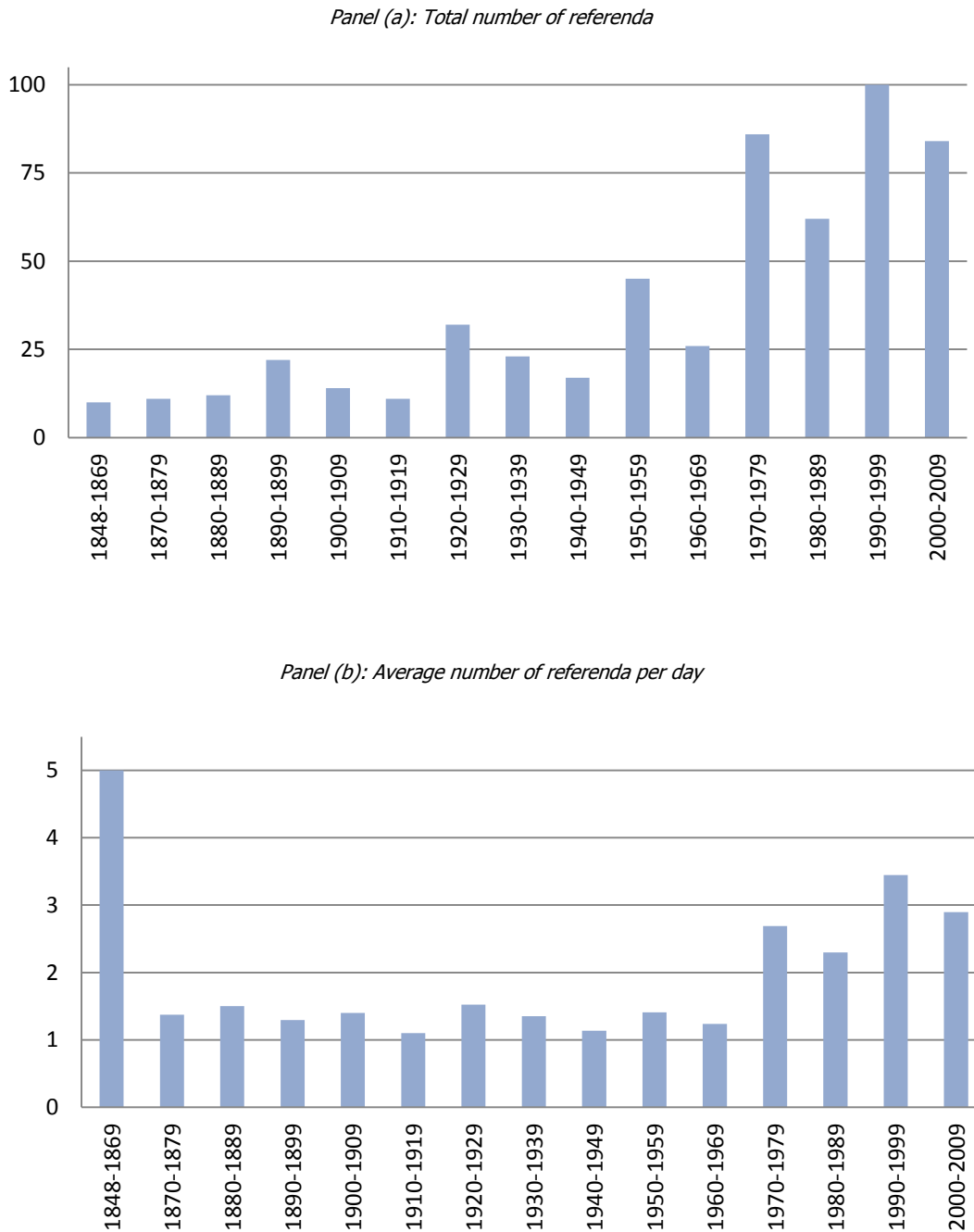
III. DATA SETTING AND IDENTIFICATION

Institutional Setting

Switzerland's federal constitution, which dates back to 1848, was basically modeled on the constitution of the United States. The Swiss parliament is made up of two houses, the National Council (*Nationalrat*), comparable to U.S. House of Representatives, and the Council of States (*Ständerat*), comparable to the U.S. Senate, and the parliamentary electoral districts comprise 26 constituencies (cantons or subnational jurisdictions). Switzerland's parliamentary system is one of direct democracy that, like over half of U.S. states, allows the holding of referenda. Not only may citizens from the 26 different constituencies challenge any law that has been passed by parliament, but a referendum is always mandatory if a parliamentary legislative proposal aims to change the constitution. Citizens themselves may also demand a constitutional amendment by referendum/initiative, a request that cannot be refused by the government and parliament unless it violates formal rules (see Portmann et al.

2012 for details). Parliament can, however, work out a direct counterproposal, which is presented to the voters at the same time as the citizen-driven initiative.⁶

Figure 1: Total number of referenda and referendum days from 1848 to 2009



Notes: First referendum was held in 1848.

⁶ A counterproposal is usually designed to be a compromise between the current status quo and the demands in the initiative (see Stadelmann et al. 2012). We separately control for counterproposals in our empirical setting.

The results of a referendum, an instrument used constantly in Switzerland since 1848, not only determine policy outcomes, they also reflect citizen preference for these outcomes. More precisely, as pointed out by Schneider, Pommerehne, and Frey (1981) or Frey 1994, referenda permit the majority to rank the policy outcomes that will be generated by the proposed laws against the status quo. They thus present dichotomous results that indicate what a majority prefers and, consequently, what the median constituent prefers (see Frey 1994 or Eichenberger et al. 2012).

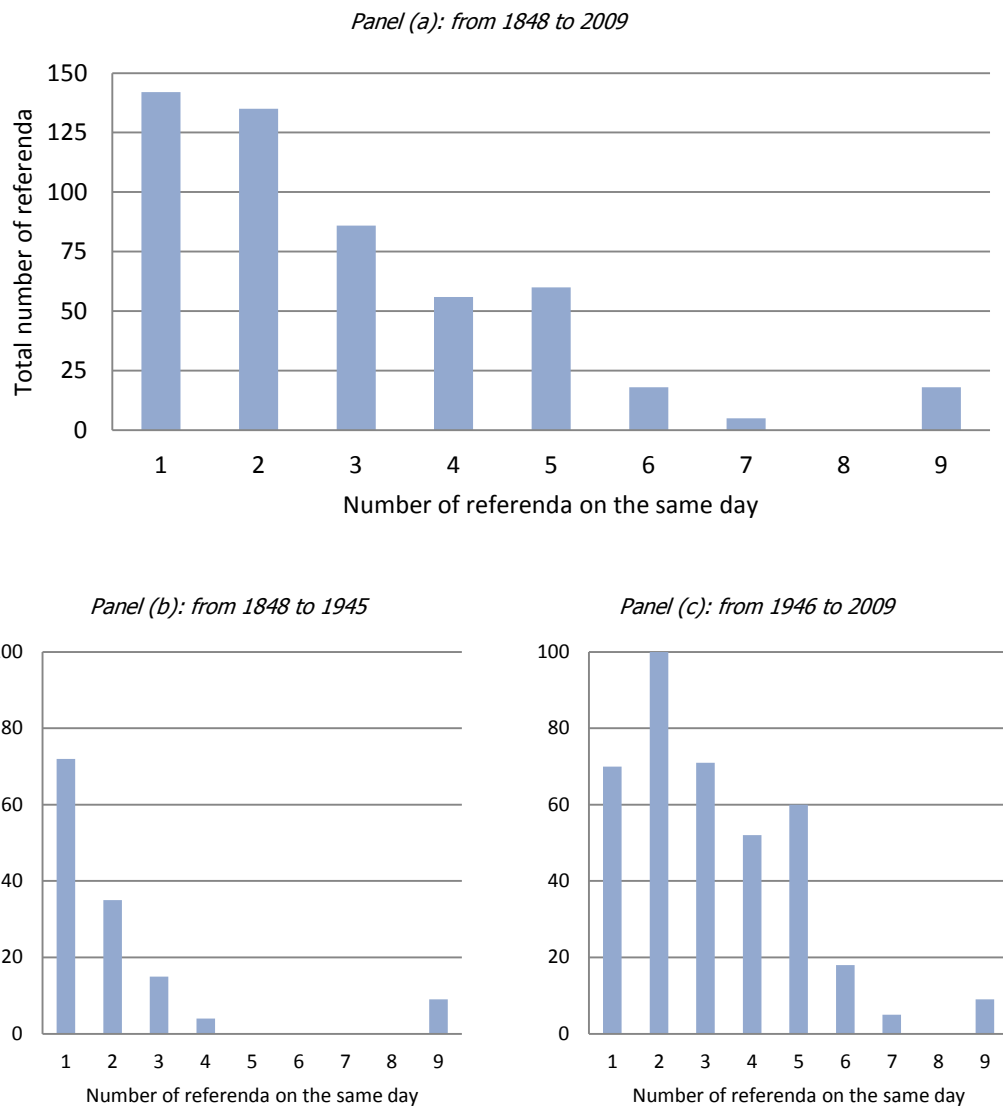
Figure 1, panel (a), summarizes the number of referenda per decade in our dataset from 1848 until the beginning of 2009. The ability to exploit such a large set of field data to identify revealed preferences and demonstrate how human problem solving and decision making takes place in a complex environment is a key strength of this paper. Since 1848, Swiss citizens have been presented with 520 unique federal referenda and 35 decisions with counterproposals, resulting in a total of 555 referenda. In terms of our dataset's time dimension, which spans three centuries, it is worth noting that 1848 is not very far away from 1789 when the U.S. Constitution became the basis for the United States federal government, only 12 years before Abraham Lincoln's election as President, and only 15 years before the Emancipation Proclamation freed slaves and gave them voting rights.

In issuing its voting recommendation for each referendum, the Swiss federal parliament naturally recommends acceptance for its own initiatives but usually suggests rejection for citizen-initiated referenda. Constituents for their part are generally well informed about parliamentary recommendations and the issues to be decided by referendum because of booklets/pamphlets sent out to voters before the election. This practice was formally initiated in 1877 when the federal council argued for giving constituents an official manifest that details the legislative proposal submitted for referendum. Parliament then entrusted the federal council with "officially and objectively informing citizens on the reasons for the referendum and how parliament formed its opinion" (translated from the German, see the appendix, Figure S1). As the federal council's address to parliament makes clear, even in the decades before 1877, voters were informed by the media about parliament's position, and as early as 1874, the federal council itself was officially disseminating such information (see BBl 1874 I 497). Thus, even when voters did not necessarily fully understand the precise issue of a referendum, they did at least know parliament's position.

Except for the very first referendum on June 6, 1848, all referenda have been held on a Sunday. Usually, according to our data, voters go to the polls between one and four days a

year⁷ to decide between a minimum of one and a maximum of nine distinct referenda issues.⁸ Panel (b) of Figure 1 shows the average number of referenda per day for all decades since 1848. This number remained stable from 1870 to the 1960s and then increased slightly.

Figure 2: Number of referenda on the same day from 1848 to 2009



Notes: The figure shows on the x-axis the number of referenda on the same day and on the y-axis the total number of referenda (without counter proposals) for the respective category.

⁷ Only in 1952, 1958, and 1985 were voters asked to go to the polls on 7, 5, and 5 days per year, respectively.

⁸ Although voters usually decide on five or fewer referenda the same day, since 1848, nine referenda decisions on the same day occurred on January 14, 1866, and May 18, 2003. Eight referenda decisions in one day has never been registered, and seven referenda decisions on one day only occurred on May 17, 1992.

Figure 2, panel (a), provides a histogram of the number of referenda per day excluding counterproposals, excluded because they are presented together with the original referendum, making the referendum a multiple decision between either the status quo, the proposed initiative, or the counterproposal.

During the current and past two centuries, there have been over 125 instances of days on which exactly one referendum was held; the remainder are days on which two or more referenda were voted on. By splitting these observations into subsamples before and after 1945 (see panels (b) and (c) of Figure 2), we show that the total number of referenda held the same day has changed over time. Before 1946, voters were more often asked to decide on a single referendum on one day, whereas from 1946 onward, the custom was rather two referenda on one day. In the empirical analysis, we account for such gradual long-term changes over the centuries by including decade fixed effects and exploring these time periods separately. All additional variables employed in the analysis, their sources, and a number of descriptive statistics are given in appendix Table A1.

Identification of Parliamentary Influence

We use our natural experimental setting across a 160-year time span to assess whether constituents' bounded rationality throws light on voting behavior; in particular, whether complexity increases voter reliance on simple rules of thumb, i.e. "follow the expert", in this case, "follow parliament". We anticipate that introducing the concept of satisficing goals may be linked to a stronger inclination to trust and rely on experts. For example, Morton and Tyran (2010) observe in a laboratory experimental setting that voters with low quality information seem to follow the rule of thumb of "letting the experts decide" (p. 41). In other words, they show that less informed voters delegate their votes to more informed voters even when it is not suboptimal to do so. This reliance on an expert once the task becomes more complex can be a normal practice that is enforced by habit and regularities of behavior (behavioral rules). Indeed, Heiner (1983) argues that behavioral rules arise because of some uncertainty as individuals distinguish between preferred and less preferred behavior. Such uncertainty leads to mechanisms that restrict flexibility in choosing potential actions, which results in selective attention to information.

To identify the effect of parliament's voting recommendation on constituents' real choices, therefore, we first distinguish between days when there is only one referendum and

days when more than one referendum takes place. Although we note that parliament might always have some influence on how constituents decide, we anticipate that parliament's influence will be larger when the number of referenda per day is higher than one. As previously discussed, the open public discussion that takes place before every referendum is easier to follow when constituents need only decide on a single issue, meaning that their attention is not divided between two or more issues that must be settled on the very same day. When faced with such decisions, Simon (1983) argues, "we all feel the overwhelming difficulty of being appropriately informed. But we do have ways of dealing with that difficulty, in matters of public policy as in matters of medicine or plumbing: we turn to experts. When we can't establish the relevant facts, we look for an expert who knows them and we listen to what he has to say. Sometimes we even take his advice without asking to have it fully explained" (pp. 94–95). The strength of our setting is that the constituents do not have to seek out experts or justify why these experts are credible, legitimate, or even likely to be right. Rather, we deal with the issue of alternative experts by including interest group voting recommendations since 1945, before which such recommendations were not officially available or collected.⁹

It is clear that when more referenda are held on the same day, constituents are more likely to refer to outside help and recommendations in making their decisions. Hence, we identify the parliamentary influence on constituent choices using the number of referenda held on the same day and then measure the influence of these recommendations on rationally bounded constituents by focusing only on days on which two or more referenda take place. As mentioned we know the turnout for all referenda on the same day since 1884, so, because constituents incur the same costs for more referenda on the same day as for one, we can use differences in turnout within constituencies to identify which referendum on a given day attracted the most constituent attention and had the highest turnout. Likewise, if better informed constituents are more likely to cast a vote, relatively less informed constituents are not but may cast a vote based heavily on parliamentary recommendation. We can therefore identify the parliamentary influence by examining the outcomes of referenda with relatively lower turnout on days when more than one referendum was held. Such an assumption is valid

⁹ Simon (1983) raises the question of how we ensure that parliamentary members' own interests do not color the advice they give. In Switzerland, members of parliament are routinely required to disclose financial and economic ties or responsibilities that might lead to a conflict of interest. Simon, however, also refers to an element that is directly linked to human bounded rationality, namely if a person becomes involved in a particular activity, devoting a lot of time to that activity, she or he will assign it a greater value than without involvement.

because focus of attention is a major determinant of choice and a key mechanism of bounded rationality (Simon 1983). A key advantage of our setting, therefore, is that we can identify the voters' focus as they simultaneously express their preferences in the ballot box.

Finally, the structure of the natural experiment solves potential causality problems. Parliament issues its voting recommendation before constituents decide on precisely the same topic. The official pamphlet sent to voters clearly highlights parliament's recommendation and explains the topic of each referendum separately including the legislative changes to laws or the constitution. Whether one or more referenda are presented on the same day depends on the number of legislative and constitutional issues that parliament decided on and the highest voting turnout identifies the referendum which received the highest attention in the public discussion before the referendum took place. Thus, complexity is also exogenously determined by the number of referenda on the same day and the focus of attention defined by the referendum with the highest turnout. On voting day constituents go to the polls and decide which referendum to accept and which to reject knowing parliament's recommendation and knowing which referendum issue has their focus of attention. Our setting allows therefore to test the simple rule of thumb: "when complexity increases, follow parliament".

IV. EMPIRICAL RESULTS OF A NATURAL EXPERIMENT

Baseline Results

The main results from our analysis of 160 years of data are given in Table 1.

Table 1: Natural setting since 1848: Average probability of constituents accepting a referendum dependent on parliamentary recommendation and number of referenda the same day

	<i>Parliament suggests NO</i>	<i>Parliament suggests YES</i>	<i>First difference</i>
Only one referendum a day	17.750*** (1.191)	60.439*** (0.935)	42.689*** (1.514)
More than one referendum a day	12.295*** (0.584)	65.402*** (0.561)	53.108*** (0.810)
	-5.455*** (1.326)	4.963*** (1.090)	10.419*** (1.718)

Notes: Values represent the average probability in percentages that constituents will accept a referendum, the first differences, and the difference in difference. Values in parentheses are standard errors. ***, **, and * indicate a mean significance level of below 1 %, between 1 and 5 %, and between 5 and 10 %, respectively.

It is first worth noting that exploring such a long time period reduces the relevance of referenda type (topic) or the influence of particular parties. Rather, we analyze the probability

of a constituency accepting a referendum dependent on whether parliament recommends a yes or no vote and whether there is only one or more than one referendum that day. If constituents are rationally bounded, they should react more to parliamentary recommendation when their attention is divided among several issues. This theoretical expectation corresponds exactly with our observations from the natural experiment. The probability of a constituency accepting a single referendum on a given day is 17.75% when parliament recommends a no vote but is 42.69 percentage points higher at 60.44% when parliament recommends a yes vote.¹⁰ However, the influence of parliament is even greater when there is more than one referendum per day: the probability of a constituency accepting a referendum falls to 12.30% when parliament recommends rejection but increases to 65.40 % when parliament suggests acceptance. Thus, when there is more than one referendum on the same day, the difference in probability is approximately 53.12 and the difference in difference is approximately 10.42 percentage points. Put differently, when constituents must decide on more than one issue, the influence of parliamentary recommendation is 10.42 percentage points higher, which is consistent with the argument that people are rationally bounded and refer to recommendations when the number of issues increases. We also note that the influence of parliament increases symmetrically in more complex voting situations: If parliament suggests to vote no the probability that constituents really vote yes drops by 5.45 percentage points from 17.75 % to 12.30 % when more than one referendum per day is held while a recommendation to vote yes by parliament increases the probability that constituents vote yes by 4.96 percentage points from 60.44 % in the case of a single referendum a day to 65.40 when more than one referendum per day is held. If constituents are rationally bounded we would precisely expect such a symmetric influence of the rule of thumb to follow parliament in more complex situations for yes and no recommendations.

¹⁰ This change in the yes vote may indicate that parliament has already an influence on voters. However, it may also indicate that parliament suggests a yes vote for sensible issues where voters would have voted yes in any case. Our natural experiment only allows us to determine whether the influence of parliament increases when complexity increases too and constituents rely on simple rules of thumb.

Table 2: Parliamentary influence on constituent referenda choices

	<i>Identification: More than one referendum</i>					<i>Identification: Low turnout referendum</i>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Years covered	1848-2009	1848-2009	1848-2009	1884-2009	1884-2009	1884-2009	1884-2009	1884-2009	1884-2009
Parliament suggests YES	1.9955*** (0.1051)	2.0107*** (0.1052)	2.1695*** (0.1119)	2.1190*** (0.1067)	2.1548*** (0.1119)	2.4834*** (0.1212)	2.5322*** (0.1236)	2.5480*** (0.1261)	2.5485*** (0.1227)
(Parliament suggests YES) * (More than one referendum)	0.6559*** (0.0857)	0.6608*** (0.0858)	0.5883*** (0.0950)	0.6050*** (0.0889)	0.5699*** (0.0958)				
More than one referendum	-0.4445*** (0.0735)	-0.4446*** (0.0735)	-0.4734*** (0.0810)	-0.5583*** (0.0765)	-0.4868*** (0.0818)				
(Parliament suggests YES) * (Low turnout referendum)						0.4010*** (0.1113)	0.3827*** (0.1121)	0.3234*** (0.1098)	0.2956*** (0.1140)
Low turnout referendum						-0.1201 (0.1013)	-0.1188 (0.1013)	-0.1013 (0.1008)	-0.0689 (0.1014)
Number of referenda the same day						0.0574*** (0.0107)	0.0559*** (0.0107)	0.0464*** (0.0107)	0.0748*** (0.0143)
Counterproposal		-0.2022*** (0.0626)	-0.2180*** (0.0508)	-0.3666*** (0.0491)	-0.3064*** (0.0472)		-0.3487*** (0.0511)	-0.4157*** (0.0488)	-0.4030*** (0.0514)
Turnout				-2.2348*** (0.1927)	-1.9953*** (0.1981)			-1.6723*** (0.2416)	-1.4259*** (0.2443)
Intercept	-1.6792*** (0.0813)	-1.6793*** (0.0813)	-1.5177*** (0.3973)	-0.4186*** (0.1265)	-0.7479*** (0.2284)	-2.3166*** (0.1156)	-2.3119*** (0.1154)	-1.4550*** (0.1676)	-2.6057*** (0.3401)
Cantonal Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Decade Fixed Effects	NO	NO	YES	NO	YES	NO	NO	NO	YES
DE Parliament suggests YES	45.85	46.17	49.18	48.43	49.14	53.40	54.43	55.52	53.58
DE (Parliament suggests YES) * (More than one referendum)	11.37	11.43	9.36	10.55	9.32				
DE (Parliament suggests YES) * (Low turnout referendum)						7.18	6.73	5.56	5.57
Sample restriction						> 1 referendum	> 1 referendum	> 1 referendum	> 1 referendum
R2	0.2958	0.2964	0.325	0.3309	0.3445	0.3339	0.3502	0.3567	0.3671
Brier	0.1929	0.1928	0.1862	0.1846	0.1817	0.1839	0.1808	0.1792	0.1765
No. Obs.	14127	14127	14127	13502	13502	9961	9961	9961	9961

Notes: The dependent variable for all logit estimations is "Constituency accepts referendum." Robust clustered standard errors for cantons (constituencies) are reported throughout the table. DE stands for discrete effect in the predicted probability. The effects for "Parliament suggests YES", "(Parliament suggests YES) * (Low turnout referendum)", "(Parliament suggests YES) * (More than one referendum)" represent discrete effects in percentage points for these coefficients when all other variables are evaluated at their median values. The evaluation of the interaction terms follows Ai and Norton (2001). ***, **, and * indicate a mean significance level of below 1 %, between 1 and 5 %, and between 5 and 10 %, respectively.

As shown in Table 2, a very similar picture emerges for a logit model analysis of the probability that a constituency will accept a referendum. Here, the dependent variable, used in all the remaining tables, is constituency acceptance of the referendum. For each of the specifications, we report robust standard errors clustered by constituency.¹¹ We also calculate discrete effects for the influence of parliamentary recommendation and the interaction terms, while holding all other variables fixed at their medians.¹² It is also important to note that we count counterproposals and initiatives as one single referendum but include their acceptance/rejection in the data.

Specification (1) is a natural experimental setting similar to that reported in Table 1. The pseudo R2 is very high for a logit model (and indeed for this type of analysis) even though the model includes no other controls apart from cantonal dummies. In this analysis, omitted variable biases are of little importance because we are only interested in the interaction term. Only the interaction term gives us the causal influence of parliament's recommendation in more complex voting situations. Thus, any variable not present in the estimations could only be characterized as omitted if it would influence the interaction term directly. We control for such potential influences in further estimates and refinements. As shown in Table 2, the interaction term is highly statistically significant at the 1% level with a positive sign. Thus, when there are more referenda per day, the parliamentary influence on constituent decisions is larger. Specifically, the discrete effects show that when there is only a single referendum proposed, constituents are 45.85 percentage points more likely to vote yes, while the interaction term indicates that this effect increases by 11.37 percentage points for more than one referendum.

Specification (2) includes a dummy for counterproposals to ensure that the observed effects are not a consequence of different reactions to parliament when there are more referenda and one is a counterproposal. Including the counterproposal variable, however, has barely any effect on our key variables (in fact, the quantitative effect is even a little larger). Specification (3) introduces decade dummies to represent technological and environmental changes that have reduced the transaction costs of information, potential changes in voter characteristics (e.g., average level of education), or simply a shift to more referenda over time. Other changes that justify the use of such time dummies include granting women the right to vote at the federal level in 1971 and the emergence of the new canton of Jura in 1979

¹¹ Observations are clustered by constituency in recognition of the likelihood that observations in the same constituency are not independent.

¹² For correct evaluation of the interaction term in logistic models, we follow Ai and Norton (2003).

(first referendum February 18, 1979). The coefficient of the interaction term, however, remains statistically positively significant with a comparable discrete effect.

Specification (4) then restricts the sample to the 1884–2009 period to reflect the fact that voter turnout data are only available from 1884 (before which there was no systematic registration of either the electorate or the number of valid votes). Turnout not only measures voters' level of interest or how well informed they are, it also covers such aspects as environmental conditions (e.g., weather). Hence, it is valuable to control for voter turnout in case voters simply do not turn up when they are not well informed, particularly when there is more than one referendum. Our results indicate that turnout has no effect on the interaction term, and the discrete effect even increases slightly to over 10 percentage points, i.e. when more referenda are held the same day the influence of parliament's recommendation on constituents real choices is significantly higher. The base effect of turnout is also negative, which may indicate that voters come to the polls if they disagree (the status quo bias). This finding, however, should not affect our experimental setting, i.e. the higher effect of parliament's recommendation in more complex voting situations when constituents follow a rule of thumb. Specification (5) incorporates decade fixed effects to control for technological and environmental changes.

To reflect our second identification approach for the focus of attention, specifications (6) to (9) include an interaction term based on the “referenda that do not have the highest turnout on the same day” (low turnout referenda) rather than “more than one referendum.” As always, because of data availability, the data sample begins in 1884 but by definition is restricted to cases with more than one referendum per day. In line with the previous results, the interaction term is positive, statistically significant and, at 7.18 percentage points, the discrete effect is surprisingly large given the small discrete effect expected if voters informed about only one referendum vote on no others. To ensure that the effects from the first identification strategy do not overlap with those based on referenda with low turnout, we also take into account “number of referenda the same day”. In line with the earlier analysis, we include the counterproposals in specification (7), check for the effects of the turnout itself in specification (8) and (9) and in (9) we include decade fixed effects. Throughout all the estimations reported in Table 2, the interaction term is statistically significant at the 1% level with a discrete effect between 5.56 and 7.18 percentage points. All the remaining estimations always include cantonal and decade fixed effects.

Robustness

Table 3 reports the results of our robustness tests. The first takes into account that the government's executive council (the federal council) also frequently makes a recommendation on a referendum, meaning that constituents may not only be influenced by parliament. For example, in three cases during our sample period, there was disagreement between the government and parliament. Even if we exclude these three cases, however, our results do not change. More important, in many cases, the government remains neutral and expresses no preference (no position), so we examine voter responses to such a situation to gauge whether constituents react to politician suggestions in general or only to the government or parliament.

Specification (1) uses a sample that begins in 1848 and includes an interaction term between government neutrality and our "more than one referendum" identifier. The results entirely confirm our expectation that constituents will react more to a neutral position if there is more than one referendum: The interaction term between "parliament suggests a yes vote" and "more than one referendum" remains highly statistically significant and positive, with a large discrete effect (14.32 percentage points) while the interaction term for "government neutral" and "more than one referendum" is both small and insignificant. Specification (2) employs a sample that starts in 1884 and includes turnout. The quantitative effects barely change for parliament's recommendation and the interaction term for "government neutral" and "more than one referendum" remains insignificant. Finally, specification (3) analyzes those referenda that do not have the highest turnout, restricting the sample (as before) to days with more than one referendum. Again, the interaction term for the government is not statistically significant, but the interaction term between for the parliamentary influence is highly significant and positive.

If politicians are in fact aware that their constituents are rationally bounded and more likely to follow parliamentary recommendations when there are more referenda on the same day, they may select to bundle referenda; particularly, if they are unsure whether the proposal will pass. If this really is the case, we should actually observe no differences because parliament's recommendations should be the same everywhere. Thus, if politicians actually do select the referendum day to increase the power of their recommendations, the effects measured so far would represent a lower bound estimate for the influence of parliament and the represent in any case evidence that constituents follow a rule of thumb.

Table 3: Parliamentary influence on constituent referenda when government is neutral and members of parliament offer divergent suggestions

	<i>Government neutral position</i>			<i>25% or more of members of parliament have diverging suggestion</i>		
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>
Years covered	1848-2009	1884-2009	1884-2009	1848-2009	1884-2009	1884-2009
Parliament suggests YES	1.8476*** (0.1052)	1.8610*** (0.1106)	2.4782*** (0.1274)	1.1985*** (0.2866)	1.1962*** (0.3102)	1.9922*** (0.1685)
(Parliament suggests YES) * (More than one referendum)	0.8278*** (0.0930)	0.7789*** (0.0968)		1.3938*** (0.3106)	1.3801*** (0.3328)	
More than one referendum	-0.6865*** (0.0850)	-0.6836*** (0.0855)		-0.7964*** (0.2155)	-0.7217*** (0.2241)	
(Parliament suggests YES) * (Low turnout referendum)			0.2859** (0.1215)			0.9889*** (0.1576)
Low turnout referendum			-0.0939 (0.0996)			-0.5107*** (0.1249)
(Government neutral) * (More than one referendum)	0.0037 (0.0698)	0.0071 (0.0724)				
(Government neutral) * (Low turnout referendum)			0.0067 (0.0805)			
Government neutral	0.8814*** (0.0671)	0.8572*** (0.0680)	0.8751*** (0.0624)			
Number of referenda the same day			0.0911*** (0.0145)			-0.0083 (0.0187)
Counterproposal	-0.4327*** (0.0506)	-0.5017*** (0.0496)	-0.5541*** (0.0540)	-0.4181*** (0.0652)	-0.4439*** (0.0641)	-0.4557*** (0.0682)
Turnout		-1.7264*** (0.1884)	-1.1955*** (0.2356)		-1.0280** (0.4461)	0.0283 (0.4550)
Cantonal Fixed Effects	YES	YES	YES	YES	YES	YES
Decade Fixed Effects	YES	YES	YES	YES	YES	YES
DE Parliament suggests YES	43.15	43.43	52.59	28.00	27.63	43.04
DE (Parliament suggests YES) * (More than one referendum)	14.32	13.74		26.59	26.78	
DE (Parliament suggests YES) * (Low turnout referendum)			5.22			16.80
Sample restriction			> 1 referendum			> 1 referendum
R2	0.3426	0.3602	0.3792	0.3254	0.3382	0.3657
Brier	0.1825	0.1784	0.1741	0.1771	0.1745	0.1709
No. Obs.	14127	13502	9961	4379	4229	3698

Notes: The dependent variable for all logit estimations is "Constituency accepts referendum". Robust clustered standard errors for cantons (constituencies) are reported throughout the table. An intercept is always included. DE stands for discrete effect in the predicted probability. The effects for "Parliament suggests YES", "(Parliament suggests YES) * (Low turnout referendum)", "(Parliament suggests YES) * (More than one referendum)" represent discrete effects in percentage points for these coefficients when all other variables are evaluated at their median values. The evaluation of the interaction terms follows Ai and Norton (2001). ***, **, and * indicate a mean significance level of below 1 %, between 1 and 5 %, and between 5 and 10 %, respectively.

It may also be, however, that minorities in parliament might try to set the referendum day in their own favor; that is, in such a way that their position has more power than the parliamentary majority's. To take these potential strategic behaviors into account, we look at the majority by which parliament passed legislative proposals. The primary methodological problem is that systematic recording of the number of parliamentary members voting yes/no only began with the introduction of an electronic voting system in 1996, so for data before

this, we had to refer to national council's collected stenographic protocols and records of which politicians voted for and against a proposal. Stenographic protocols, however, particularly up until 1870 and between 1930 and 1945, do not always mention the exact majorities, only the final parliamentary decision. Hence, we have no information on the exact majorities in a total of 113 cases.

To determine whether minority positions led parliament to strategically bundle referenda on the same day, specification (4) restricts the analysis only to recommendations on which 25% or more of members of parliament disagreed. Not only is the interaction term significant and positive but the discrete effect is higher than before. Thus, it is not the minorities who bundle/unbundle referenda on a single day; rather, they may only prevent the majority from strategically scheduling more referenda on the same day. This interpretation would explain why we now also find a higher effect of the influence of the parliamentary majority (i.e., parliamentary recommendation). Both specification (5), which uses data from 1884 onward, and specification (6), which analyzes referenda with low turnout (in line with specification (3)), also return a higher discrete effect.

We now explore different time periods and present the results in Table 4. In specifications (1) to (3), we exclude World War I and II, as those years represent exceptional circumstances. Such exclusion, however, has no effect on our key results. In specifications (4) to (5), we look at a more recent time period (1946 to 2009), a very stable era in Switzerland with good economic growth, increased wealth, and stable institutions. Although all interaction terms are significant, the discrete effect in specification (4) is relatively smaller, most probably because of the post-1945 tendency to hold more referenda on one day (see previous figures). Yet this finding also implies that the effect of the interaction with "low turnout referendum" should become more important, which is precisely the case—the discrete effect is 6.51 percentage points compared to around 5 percentage points in earlier estimates. Specifications (6) to (8) focus on the period up until 1945. Specification (6) produces the now typical result: the discrete effect is again higher because of a reference group with a sufficient number of observations (see Figure 2, panel b). In specification (7), however, for the first time, the interaction effect between "Parliament suggests YES" and "Low turnout referendum" is not statistically significant. We assume two possible reasons for this result: (1) the sample is comparatively small or (2) the instances of two or more referenda before 1945 are few, so low turnout referenda are identified mostly on days with two referenda. We solve this bias in specification (8) by controlling for days with only one referendum.

Table 4: Robustness tests with different periods - Influence of Parliament on constituents' choices in referenda

	<i>Without World War I and World War II</i>			<i>From 1946 to 2009</i>		<i>From 1884 to 1945</i>		
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>	<i>(7)</i>	<i>(8)</i>
Years covered	1848-2009	1884-2009	1884-2009	1945-2009	1945-2009	1884-1945	1884-1945	1884-1945
Parliament suggests YES	2.2389*** (0.1235)	2.2305*** (0.1239)	2.5415*** (0.1230)	2.5505*** (0.1555)	2.5790*** (0.1287)	1.5306*** (0.1833)	2.0152*** (0.2363)	1.6656*** (0.1702)
(Parliament suggests YES) * (More than one referendum)	0.5246*** (0.0933)	0.4945*** (0.0934)		0.2557** (0.1202)		0.7568*** (0.1812)		
More than one referendum	-0.4215*** (0.0834)	-0.4271*** (0.0842)		-0.1953 (0.1211)		-0.7927*** (0.1490)		
(Parliament suggests YES) * (Low turnout referendum)			0.2889** (0.1137)		0.3156*** (0.1162)		0.1186 (0.2419)	0.6062*** (0.1695)
Low turnout referendum			-0.0468 (0.1011)		-0.0129 (0.1019)		-0.3216 (0.2323)	-0.7438*** (0.1652)
Number of referenda the same day			0.0734*** (0.0143)		0.0853*** (0.0150)		-1.1675*** (0.1133)	-0.9466*** (0.1283)
Exactly one referendum per day								-1.3179*** (0.1752)
Counterproposal	-0.3439*** (0.0514)	-0.4262*** (0.0478)	-0.4604*** (0.0535)	-0.5698*** (0.0549)	-0.5050*** (0.0589)	0.9836*** (0.1427)	0.7162*** (0.1896)	1.0211*** (0.1519)
Turnout		-1.9745*** (0.2006)	-1.4116*** (0.2448)	-1.9797*** (0.3172)	-1.7267*** (0.3806)	-2.1293*** (0.3014)	-1.0739** (0.5206)	-2.0597*** (0.3105)
Cantonal Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Decade Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
DE Parliament suggests YES	50.42	50.52	53.40	55.62	53.48	36.50	44.48	39.37
DE (Parliament suggests YES) * (More than one referendum)	8.24	7.96		3.82		13.57		
DE (Parliament suggests YES) * (Low turnout referendum)			5.63		6.51		3.89	9.80
Sample restriction			> 1 referendum		> 1 referendum		> 1 referendum	
R2	0.323	0.3424	0.362	0.374	0.3801	0.2854	0.3653	0.3079
Brier	0.1866	0.1822	0.1776	0.1753	0.1734	0.1922	0.1781	0.1882
No. Obs.	13652	13027	9861	10577	8686	2925	1275	2925

Notes: The dependent variable for all logit estimations is "Constituency accepts referendum". Robust clustered standard errors for cantons (constituencies) are reported throughout the table. An intercept is always included. DE stands for discrete effect in the predicted probability. The effects for "Parliament suggests YES", "(Parliament suggests YES) * (Low turnout referendum)", "(Parliament suggests YES) * (More than one referendum)" represent discrete effects in percentage points for these coefficients when all other variables are evaluated at their median values. The evaluation of the interaction terms follows Ai and Norton (2001). ***, **, and * indicate a mean significance level of below 1 %, between 1 and 5 %, and between 5 and 10 %, respectively.

Table 5: Robustness tests using number of referenda on the same day

	<i>More than two referenda</i>		<i>More than three referenda</i>		<i>Number of referenda</i>
	(1)	(2)	(3)	(4)	(5)
Years covered	1848-2009	1884-2009	1848-2009	1884-2009	1848-2009
Parliament suggests YES	2.2565*** (0.0924)	2.7116*** (0.1709)	2.3509*** (0.0867)	2.5194*** (0.1566)	1.7403*** (0.0949)
(Parliament suggests YES) * (More than two referenda)	0.7417*** (0.0765)				
More than two referenda	-0.6557*** (0.0713)				
(Parliament suggests YES) * (More than three referenda)			0.8862*** (0.1130)		
More than three referenda			-0.3541*** (0.0875)		
(Parliament suggests YES) * (Number of referenda the same day)					0.3103*** (0.0281)
Number of referenda the same day		0.1740*** (0.0229)		0.0850** (0.0366)	-0.1793*** (0.0241)
(Parliament suggests YES) * (Low turnout referendum)		0.5391*** (0.1538)		0.8113*** (0.1964)	
Low turnout referendum		-0.1951 (0.1260)		-0.2158 (0.1582)	
Exactly two referenda the same day	0.0786** (0.0319)				
Exactly two or three referenda the same day			-0.0437 (0.0326)		
Counterproposal	-0.2149*** (0.0506)	-0.7686*** (0.0785)	-0.1918*** (0.0511)	-0.4511*** (0.1032)	-0.2083*** (0.0512)
Turnout		-3.1623*** (0.5265)		-3.9928*** (0.8108)	
Cantonal Fixed Effects	YES	YES	YES	YES	YES
Decade Fixed Effects	YES	YES	YES	YES	YES
DE Parliament suggests YES	50.84	53.47	52.08	53.04	46.73
DE (Parliament suggests YES) * (More than two referenda)	10.74				
DE (Parliament suggests YES) * (More than three referenda)			14.50		
DE (Parliament suggests YES) * (Number of referenda the same day)					
DE (Parliament suggests YES) * (Low turnout referendum)		9.19		14.02	5.31
Sample restriction		> 2 referenda		> 3 referenda	
R2	0.3273	0.4539	0.3308	0.494	0.3312
Brier	0.186	0.1551	0.1851	0.1459	0.1853
No. Obs.	14127	6329	14127	4015	14127

Notes: The dependent variable for all logit estimations is "Constituency accepts referendum". Robust clustered standard errors for cantons (constituencies) are reported throughout the table. An intercept is always included. DE stands for discrete effect in the predicted probability. The effects for "Parliament suggests YES", "(Parliament suggests YES) * (Low turnout referendum)", "(Parliament suggests YES) * (More than one referendum)" represent discrete effects in percentage points for these coefficients when all other variables are evaluated at their median values. The evaluation of the interaction terms follows Ai and Norton (2001). ***, **, and * indicate a mean significance level of below 1 %, between 1 and 5 %, and between 5 and 10 %, respectively.

Refinements

We now refine our specifications as follows: In specification (1) of Table 5, we analyze the interaction term that represents more than two referenda instead of more than one and also control for the variable “exactly two referenda on the same day.” Again, the interaction is positively significant, with a discrete effect over 10 percentage points. These results demonstrate that most of the previous effects hold especially when there are more referenda per day. We apply the same approach to specification (2) using our second identification strategy (“low turnout referendum”), although it should again be stressed that the dataset used in this estimation is restricted to days with more than two referenda. In specifications (3) and (4), we go a step further by concentrating on three or more referenda. In all cases, the interaction term is significantly positive and the discrete effects are larger than in specifications (1) and (2). Finally, specification (5) runs the interaction directly with the number of referenda per day (instead of with a dummy) and we thus suppose a change from one to two referenda for the discrete effect. The interaction term, however, is again significantly positive.

Because interest groups may also give voting recommendations, our next step is to investigate their effect (see Table 6) using official interest group voting recommendations from 1945, when they were first available or officially collected. We have data for three groups whose interest is the economy, *Zentralverband schweizerischer Arbeitgeber-Organisationen*, *Economiesuisse*, and *Schweizerischer Gewerbeverband*; three that cover unions, *Schweizerischer Gewerkschaftsbund*, and *Travail.Suisse*, which merged with *Vereinigung schweizerischer Angestelltenverbände* in 2002; and one that concentrates on farmers, *Schweizerischer Bauernverband*. Although other interest groups and regional organizations exist, these seven are arguably the most important and have the highest number of active participants. We evaluate only those referenda for which at least one interest group made an official voting recommendation and construct dummies that identify whether the interest group recommendations are divergent or whether all interest groups suggested a yes vote. As Table 6 shows, in specification (1), the interaction term is not significant when interest groups have divergent opinions and, as expected, only the interaction term for parliamentary recommendation remains significant.

Table 6: Parliamentary influence on constituent referenda choices in the presence of interest group recommendations

	<i>At least one interest group's suggestion</i>				<i>More than two interest groups' suggestions</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
Years covered	1945-2009	1945-2009	1945-2009	1945-2009	1945-2009	1945-2009
Parliament suggests YES	2.4929*** (0.1550)	2.6452*** (0.1348)	1.4803*** (0.2107)	1.8857*** (0.1760)	1.5476*** (0.2280)	1.9089*** (0.1895)
(Parliament suggests YES) * (More than one referendum)	0.3899*** (0.1225)		0.7320*** (0.1709)		0.7842*** (0.1792)	
More than one referendum	-0.2176* (0.1278)		-0.3822 (0.2405)		-0.6489*** (0.2410)	
(Parliament suggests YES) * (Low turnout referendum)		0.3130** (0.1282)		0.4612*** (0.1533)		0.6384*** (0.1724)
Low turnout referendum		-0.0268 (0.1137)		-0.0983 (0.1482)		-0.6094*** (0.1979)
(Interest groups divergent) * (More than one referendum)	0.0901 (0.0858)		0.0565 (0.2557)		0.3053 (0.2869)	
(Interest groups divergent) * (Low turnout referendum)		-0.0799 (0.0926)		-0.0610 (0.1823)		0.3241 (0.2202)
Interest groups divergent	-0.5250*** (0.0879)	-0.3658*** (0.0861)	0.9703*** (0.1873)	1.0921*** (0.2225)	0.9398*** (0.2402)	1.1358*** (0.2352)
(All interest groups suggest YES) * (More than one referendum)			-0.1689 (0.2553)		-0.3396 (0.3189)	
(All interest groups suggest YES) * (Low turnout referendum)				-0.0834 (0.2169)		0.2910 (0.2546)
All interest groups suggest YES			1.9742*** (0.2076)	1.8739*** (0.2554)	2.1422*** (0.2993)	1.7046*** (0.2653)
Number of referenda the same day		0.0887*** (0.0146)		0.0811*** (0.0149)		0.1212*** (0.0197)
Counterproposal	-0.5686*** (0.0643)	-0.4293*** (0.0781)	-0.5374*** (0.0674)	-0.4096*** (0.0831)	-0.6590*** (0.0740)	-0.4460*** (0.0880)
Turnout	-2.2539*** (0.3417)	-2.1951*** (0.4138)	-2.0763*** (0.3595)	-2.0928*** (0.4258)	-2.0752*** (0.3933)	-2.2142*** (0.4712)
Cantonal Fixed Effects	YES	YES	YES	YES	YES	YES
Decade Fixed Effects	YES	YES	YES	YES	YES	YES
DE Parliament suggests YES	55.23	56.58	22.32	25.52	24.07	23.99
DE (Parliament suggests YES) * (More than one referendum)	6.35		11.25		7.54	
DE (Parliament suggests YES) * (Low turnout referendum)		5.73		8.98		3.24
Sample restriction	>= 1 interest group	>= 1 interest group & > 1 referendum	>= 1 interest group	>= 1 interest group & > 1 referendum	>= 2 interest groups	>= 2 interest groups & > 1 referendum
R2	0.4005	0.4087	0.4219	0.429	0.4158	0.4259
Brier	0.1688	0.1666	0.1648	0.1626	0.1673	0.1643
No. Obs.	10201	8385	10201	8385	8932	7516

Notes: The dependent variable for all logit estimations is "Constituency accepts referendum". Robust clustered standard errors for cantons (constituencies) are reported throughout the table. An intercept is always included. DE stands for discrete effect in the predicted probability. The effects for "Parliament suggests YES", "(Parliament suggests YES) * (Low turnout referendum)", "(Parliament suggests YES) * (More than one referendum)" represent discrete effects in percentage points for these coefficients when all other variables are evaluated at their median values. The evaluation of the interaction terms follows Ai and Norton (2001). ***, **, and * indicate a mean significance level of below 1 %, between 1 and 5 %, and between 5 and 10 %, respectively.

Specification (2) focuses only on the "Low turnout referendum". The coefficient of the interaction term for these referenda and interest groups is insignificant while the interaction

term for the recommendation of the parliament and referenda that do not have the highest turnout is statistically significant. Thus, the results are consistent even when controlling for interest groups.

Specifications (3) and (4) test whether citizens react more to interest groups when there is more than one referendum and interest groups clearly suggest a yes vote. The insignificance of the interaction with interest groups and number of referenda indicates that when constituents are rationally bounded, they listen to parliament not interest groups, possibly because elected politicians are their representatives in the political arena. Nonetheless, recognizing that the results of the previous specifications could have been affected if only one interest group made an official recommendation, in specifications (5) and (6), we attempt to avoid such problems by restricting the sample to those referenda in which at least two interest groups expressed an opinion. The previously obtained results remain robust: Constituents follow the rule of thumb of “following parliament’s recommendation” when more referenda are held the same day and in referenda that did not obtain their focus of attention.

V. CONCLUSIONS

This study explores whether a higher level of complexity leads to an increased reliance on expert knowledge, a topic on which, surprisingly, there seems to be little empirical evidence. Specifically, we exploit a natural experimental setting of voter practices in Switzerland, whose institutional environment has been stable since 1848. The dataset for this unique setting includes information on voting behavior in referenda over a 160-year period (1848-2009) that spans three centuries. Our results suggest that humans follow simple rules of thumb by relying on the expert specialist when several simultaneous problems demand concentrated attention.

We model complexity in two ways: by distinguishing between days with only one referendum and days with two or more referenda and by focusing only on the latter. First, in line with our prediction that when more referenda are held on the same day, constituents will be more likely to seek outside help, we use the number of referenda held on the same day to identify the influence of parliament on constituent choices. We find evidence that parliamentary influence is greater when the number of referenda is higher than when there is only one referendum per day. Second, recognizing that on days with two or more referenda, constituents incur the same costs for turning up for the first as for the second or third

referendum on the same day, we use the differences in turnout within constituencies to identify which referendum of a given day attracted the most attention. Most particularly, by focusing on referenda with a relatively lower turnout on multiple referenda days, we identify the influence of parliamentary recommendations when constituents are rationally bounded and follow simple rules of thumb.

The strength of this empirical design is that we can use the percentage of voter turnout to directly identify voters' *focus of attention* when the choices are multiple. Not only is the quantitative effect large, but it remains consistently so throughout our numerous robustness tests and refinements, such as excluding World War I and II, exploring different time periods, controlling for potential strategic behavior, and making government opinion neutral. We also control for the effects of interest groups and show that constituents are more likely to listen to parliament for their recommendations than to interest groups.

Overall, our results show that a bounded rationality framework can throw light on *how* people vote and, once the (voting) task is held constant over a long period of time, provide empirical evidence on *procedural rationality*. Yet most of the voting literature so far focuses keenly on *why* people vote in an attempt to understand the *paradox of not voting* (see, e.g., Feddersen 2004 for an overview). The simplicity of our setting also allows us to identify the effect of parliamentary voting recommendations on constituents' *real choices* while clearly revealing the preferences of both the constituents and parliament. Most particularly, we identify a strong invariance in voting behavior that almost resembles a law of *qualitative* structure (Newell and Simon 1976).¹³ We further observe a tendency for voters to follow the rule of thumb or heuristic that when many problems demand concentrated attention simultaneously, humans are more likely to rely on expert advice. That this behavior remains robust over three centuries despite environmental changes implies a simple choice mechanism that explains a substantial number of observed choices. Our results therefore provide valuable insights into how humans use limited computational capacity to deal with differences in information complexity, which always arise in modern societies and when dealing with political matters. We conclude with a quote from Simon (1978) who above all stresses the importance of seeing attention as a scarce resource: “[When] important new policies must be formulated, public and official attention must be focused on one or a few matters. Other concerns, no matter how pressing, must wait their turn on the agenda... The management of

¹³ Simon (1990) makes a statement about psychology that can also be applied to other social sciences: “Psychology does not much resemble classical mechanics, nor should it aim to do so. Its laws are, and will be, limited in range and generality and will be mainly qualitative” (p. 2).

attention and tracing indirect consequences of action are two of the basic issues of procedural rationality that confront a modern society... “Reasonable men” reach “reasonable” conclusions in circumstances where they have no prospect of applying classical models of substantive rationality. We know only imperfectly how they do it... the study of procedural rationality in circumstances where attention is scarce, where problems are immensely complex, and where crucial information is absent presents a host of challenging and fundamental research problems to anyone who is interested in the rational allocation of scarce resources” (pp. 13-14).

REFERENCES

- Ai, C., Norton, E. C. (2003), Interaction Terms in Logit and Probit models, *Economics Letters* **80**(1), 123–129
- Baumol, W. J. (2004). On Rational Satisficing, in: M. Augier and J. G. March (eds.), *Models of a Man. Essays in Memory of Herbert A. Simon*. Cambridge, Massachusetts: MIT Press, pp. 57-66.
- Baumol, W. J. and R. E. Quandt (1964). Rule of Thumb and Optimally Imperfect Decisions, *American Economic Review*. 54: 23-46.
- Clark, J. M. (1918). Economics and Modern Psychology: I, *Journal of Political Economy*. 26: 1-30.
- Conlisk, J. (1996). Why Bounded Rationality?, *Journal of Economic Literature*. 34: 669-700.
- Crain, W. M., D. R. Leavens, and L. Abbot (1987). Voting and Not Voting at the Same Time, *Public Choice*. 53: 221–229.
- Downs, A. (1957). *An Economic Theory of Democracy*. New York: Harper & Row.
- Eichenberger, R. D. Stadelmann and M. Portmann (2012). A Comparative Analysis of the Voting Behavior of Constituents and their Representatives for Public Debts, *Constitutional Political Economy*. 23: 244-260
- Feddersen, T. J. (2004). Rational Choice Theory and the Paradox of Not Voting, *Journal of Economic Perspectives*. 18: 99–112.
- Frey, B. S. (1994). Direct Democracy: Politico-Economic Lessons from Swiss Experience, *American Economic Review*. **84**: 338-42.
- Friedman, M. (1953). *Essays in Positive Economics*. Chicago: University of Chicago Press.
- Gigerenzer, G., R. Hertwig, and T. Pachur (2011). *Heuristics. The Foundation of Adaptive Behavior*. Oxford: Oxford University Press.
- Greenberg, D. S. The Scope of the Initiative and Referendum in California, *California Law Review*. 54: 1717–1748.
- Grönlund, K. and M. Setälä (2007). Political Trust, Satisfaction and Voter Turnout, *Comparative European Politics*. 5: 400–422.
- Heiner, R. A. (1983). The Origin of Predictable Behavior. *American Economic Review*. 73: 560–595.

Hodgson, G. M. (1997). The Ubiquity of Habits and Rules, *Cambridge Journal of Economics*. 21: 663–684.

Kahneman, D. (2003). Maps of Bounded Rationality: Psychology for Behavioral Economics. *American Economic Review*. 93: 1449–1475.

Morton, R. and J.-R. Tyran (2010). Let the Experts Decide? Asymmetric Information, Abstention, and Coordination in Standing Committees, unpublished manuscript.

Newell, A. and H. A. Simon (1976). Computer Science as Empirical Inquiry: Symbols and Search, *Communication of the ACM*. 19: 113–125.

Portmann, M., D. Stadelmann and R. Eichenberger (2012). District Magnitude and Representation of the Majority's Preferences: Quasi-Experimental Evidence from Popular and Parliamentary Votes, *Public Choice*. 151: 585-610.

Reutskaja, E., R. Nagel, C. F. Camerer, and A. Rangel (2001). Search Dynamics in Consumer Choice under Time Pressure: An Eye-Tracking Study, *American Economic Review*. 101: 900–926.

Schneider, F., W. W. Pommerehne, B. S. and Frey. (1981). Politico-Economic Interdependence in a Direct Democracy: The case of Switzerland, in D. A. Hibbs and H. Fassbender (ed.), *Contemporary Political Economy, Studies on the Interdependence of Politics and Economics*, Amsterdam: North Holland.

Shachar, R. and B. Nalebuff (1999). Follow the Leader: Theory and Evidence on Political Participation, *American Economic Review*. 89: 525–547.

Simon, H. A. (1955). A Behavioral Model of Rational Choice, *Quarterly Journal of Economics*. 69: 99–118.

Simon, H. A. (1956). Rational Choice and the Structure of the Environment, *Psychological Review*. 63: 129–138.

Simon, H. A. (1957). *Models of Man*. New York: John Wiley & Sons.

Simon, H. A. (1959). Theories of Decision-Making in Economics and Behavioral Science, *American Economic Review*. 49: 253-283.

Simon, H. A. (1972). Theories of Bounded Rationality, in C.B. McGuire and R. Radner (eds.), *Decision and Organization*. North-Holland Publishing Company.

Simon, H. A. (1978). Rationality as Process and as Product of Thought, *American Economic Review*. 68: 1-16.

Simon, H. A. (1983). *Reason in Human Affairs*. Stanford: Stanford University Press.

Simon, H.A. (1986). Rationality in Psychology and Economics, *Journal of Business*. 59: S209–S224.

Simon, H. A. (1990). Invariants of Human Behavior, *Annual Review of Psychology*, 41: 1–19.

Simon, H. A. (1992). Methodological Foundations of Economics, in: J.L. Auspitz, W. W. Gasparski, M. K. Mlicki, and K. Szaniawski (eds.), *Praxiologies and the Philosophy of Economics*. New Brunswick, NJ: Transactions Publishers.

Simon, H. A. (1996). *The Science of the Artificial*. Cambridge, Massachusetts: MIT Press.

Simon, H. A. (2000). Bounded Rationality in Social Science: Today and Tomorrow. *Mind & Society*. 1: 2–39.

Stadelmann, D., M. Portmann, R. Eichenberger (2012). Quantifying Parliamentary Representation of Constituents' Preferences with Quasi-Experimental Data, *Journal of Comparative Economics*. forthcoming.

Table A1: Data description and sources

Variable	Description & Source	Available since	1848-2009		1848-1945		1946-2009	
			Mean	SD	Mean	SD	Mean	SD
Constituency accepts referendum	Indicator variable: Constituency (canton) accepts the referendum. Federal Statistical Office and Swissvotes Database.	1848	0.4907	0.4999	0.4856	0.4999	0.4924	0.5000
Parliament suggests YES	Indicator variable: Parliamentary majority suggests to vote YES. Federal Statistical Office and Swissvotes Database.	1848	0.7031	0.4569	0.7887	0.4083	0.6743	0.4687
More than one referendum	Indicator variable: More than one referendum on the same day. Author construction.	1848	0.7334	0.4422	0.4718	0.4993	0.8212	0.3832
More than two referenda	Indicator variable: More than two referenda on the same day. Author construction.	1848	0.4692	0.4991	0.2042	0.4032	0.5582	0.4966
More than three referenda	Indicator variable: More than three referenda on the same day. Author construction.	1848	0.3001	0.4583	0.0916	0.2884	0.3701	0.4829
Low turnout referendum	Indicator variable: Turnout in constituency is not highest when there is more than one referendum on the same day (takes a value of 0 by default when there is only one referendum on the same day). Author construction.	1884	0.4822	0.4997	0.2492	0.4326	0.5466	0.4979
Number of referenda the same day	Number of referenda on the same day. Federal Statistical Office and Swissvotes Database.	1848	2.8810	1.8827	2.0850	1.9629	3.1480	1.7768
Counterproposal	Indicator variable: Referendum is a parliamentary counterproposal to an initiative. Federal Statistical Office and Swissvotes Database.	1848	0.0631	0.2432	0.0493	0.2165	0.0678	0.2514
Turnout	Number of valid votes in the constituency divided by number of eligible voters. Federal Statistical Office.	1884	0.4615	0.1506	0.5526	0.1970	0.4363	0.1236
Government neutral	Indicator variable: Government does not give a voting recommendation. Federal Statistical Office and Swissvotes Database.	1848	0.2531	0.4348	0.4577	0.4983	0.1845	0.3879
Interest groups divergent	Indicator variable: One or more major interest groups offer divergent voting recommendations. Federal Statistical Office and Swissvotes Database.	1945	0.4816	0.4997			0.4828	0.4997
All interest groups suggest YES	Indicator variable: All major interest groups suggest a YES vote. Federal Statistical Office and Swissvotes Database.	1945	0.3679	0.4823			0.3664	0.4818

Notes: Unweighted descriptive statistics. Data sources indicated next to variable descriptions.

Bundesbeschluss

betreffend

Begleitung der einer Volksabstimmung zu unterstellenden Bundesgesetze oder Bundesbeschlüsse mit erläuternden Botschaften.

Die Bundesversammlung
der schweizerischen Eidgenossenschaft
beschließt:

Art. 1. Wenn ein Bundesgesetz oder ein Bundesbeschluss nach Art. 89 der Bundesverfassung einer Volksabstimmung unterstellt wird, so soll jeweilen gleichzeitig mit dem Gesetz oder Beschluss den stimmberechtigten Bürgern eine objektiv gehaltene offizielle Kundgebung über die Gründe zugestellt werden, welche die Bundesversammlung zur Annahme des Gesetzes oder Beschlusses bewogen haben.

Art. 2. In der Regel ist der Bundesrath beauftragt, diese Botschaft abzufassen und zu unterzeichnen. Immerhin kann die Bundesversammlung in getrennter Berathung der beiden Rätthe bestimmen, daß sie einen Ausschuss aus ihrer Mitte beauftrage, die Botschaft zu entwerfen und zu unterzeichnen, oder sie im Einverständniß mit dem Bundesrathe auszuarbeiten und zu unterzeichnen.

Art. 3. Gegenwärtiger Beschluss tritt sofort in Wirksamkeit.

NOTE DI LAVORO DELLA FONDAZIONE ENI ENRICO MATTEI

Fondazione Eni Enrico Mattei Working Paper Series

Our Note di Lavoro are available on the Internet at the following addresses:

<http://www.feem.it/getpage.aspx?id=73&sez=Publications&padre=20&tab=1>
http://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=266659
<http://ideas.repec.org/s/fem/femwpa.html>
<http://www.econis.eu/LNG=EN/FAM?PPN=505954494>
<http://ageconsearch.umn.edu/handle/35978>
<http://www.bepress.com/feem/>

NOTE DI LAVORO PUBLISHED IN 2012

CCSD	1.2012	Valentina Bosetti, Michela Catenacci, Giulia Fiorese and Elena Verdolini: The Future Prospect of PV and CSP Solar Technologies: An Expert Elicitation Survey
CCSD	2.2012	Francesco Bosello, Fabio Eboli and Roberta Pierfederici: Assessing the Economic Impacts of Climate Change. An Updated CGE Point of View
CCSD	3.2012	Simone Borghesi, Giulio Cainelli and Massimiliano Mozzanti: Brown Sunsets and Green Dawns in the Industrial Sector: Environmental Innovations, Firm Behavior and the European Emission Trading
CCSD	4.2012	Stergios Athanassoglou and Valentina Bosetti and Gauthier de Maere d'Aertrycke: Ambiguous Aggregation of Expert Opinions: The Case of Optimal R&D Investment
CCSD	5.2012	William Brock, Gustav Engstrom and Anastasios Xepapadeas: Energy Balance Climate Models and the Spatial Structure of Optimal Mitigation Policies
CCSD	6.2012	Gabriel Chan, Robert Stavins, Robert Stowe and Richard Sweeney: The SO₂ Allowance Trading System and the Clean Air Act Amendments of 1990: Reflections on Twenty Years of Policy Innovation
ERM	7.2012	Claudio Morana: Oil Price Dynamics, Macro-Finance Interactions and the Role of Financial Speculation
ES	8.2012	Gérard Mondello: The Equivalence of Strict Liability and Negligence Rule: A « Trompe l'œil » Perspective
CCSD	9.2012	Eva Schmid, Brigitte Knopf and Nico Bauer: REMIND-D: A Hybrid Energy-Economy Model of Germany
CCSD	10.2012	Nadia Ameli and Daniel M. Kammen: The Linkage Between Income Distribution and Clean Energy Investments: Addressing Financing Cost
CCSD	11.2012	Valentina Bosetti and Thomas Longden: Light Duty Vehicle Transportation and Global Climate Policy: The Importance of Electric Drive Vehicles
ERM	12.2012	Giorgio Gualberti, Morgan Bazilian, Erik Haites and Maria da Graça Carvalho: Development Finance for Universal Energy Access
CCSD	13.2012	Ines Österle: Fossil Fuel Extraction and Climate Policy: A Review of the Green Paradox with Endogenous Resource Exploration
ES	14.2012	Marco Alderighi, Marcella Nicolini and Claudio A. Piga: Combined Effects of Load Factors and Booking Time on Fares: Insights from the Yield Management of a Low-Cost Airline
ERM	15.2012	Lion Hirth: The Market Value of Variable Renewables
CCSD	16.2012	F. Souty, T. Brunelle, P. Dumas, B. Dorin, P. Ciais and R. Crassous: The Nexus Land-Use Model, an Approach Articulating Biophysical Potentials and Economic Dynamics to Model Competition for Land-Uses
CCSD	17.2012	Erik Ansink, Michael Gengenbach and Hans-Peter Weikard: River Sharing and Water Trade
CCSD	18.2012	Carlo Carraro, Enrica De Cian and Massimo Tavoni: Human Capital, Innovation, and Climate Policy: An Integrated Assessment
CCSD	19.2012	Melania Michetti and Ramiro Parrado: Improving Land-use modelling within CGE to assess Forest-based Mitigation Potential and Costs
CCSD	20.2012	William Brock, Gustav Engstrom and Anastasios Xepapadeas: Energy Balance Climate Models, Damage Reservoirs and the Time Profile of Climate Change Policy
ES	21.2012	Alireza Naghavi and Yingyi Tsai: Cross-Border Intellectual Property Rights: Contract Enforcement and Absorptive Capacity
CCSD	22.2012	Raphael Cael and Antoine Dechezleprêtre: Environmental Policy and Directed Technological Change: Evidence from the European carbon market
ERM	23.2012	Matteo Manera, Marcella Nicolini and Ilaria Vignati: Returns in Commodities Futures Markets and Financial Speculation: A Multivariate GARCH Approach
ERM	24.2012	Alessandro Cologni and Matteo Manera: Oil Revenues, Ethnic Fragmentation and Political Transition of Authoritarian Regimes
ERM	25.2012	Sanya Carley, Sameeksha Desai and Morgan Bazilian: Energy-Based Economic Development: Mapping the Developing Country Context
ES	26.2012	Andreas Groth, Michael Ghil, Stéphane Hallegatte and Patrice Dumas: The Role of Oscillatory Modes in U.S. Business Cycles
CCSD	27.2012	Enrica De Cian and Ramiro Parrado: Technology Spillovers Embodied in International Trade: Intertemporal, Regional and Sectoral Effects in a Global CGE Framework
ERM	28.2012	Claudio Morana: The Oil Price-Macroeconomy Relationship since the Mid- 1980s: A Global Perspective
CCSD	29.2012	Katie Johnson and Margaretha Breil: Conceptualizing Urban Adaptation to Climate Change Findings from an Applied Adaptation Assessment Framework

ES	30.2012	Angelo Bencivenga, Margaretha Breil, Mariaester Cassinelli, Livio Chiarullo and Annalisa Percoco: The Possibilities for the Development of Tourism in the Appennino Lucano Val d'Agri Lagonegrese National Park: A Participative Qualitative-Quantitative Approach
CCSD	31.2012	Tim Swanson and Ben Groom: Regulating Global Biodiversity: What is the Problem?
CCSD	32.2012	J. Andrew Kelly and Herman R.J. Vollebergh: Adaptive Policy Mechanisms for Transboundary Air Pollution Regulation: Reasons and Recommendations
CCSD	33.2012	Antoine Dechezleprêtre, Richard Perkins and Eric Neumayer: Regulatory Distance and the Transfer of New Environmentally Sound Technologies: Evidence from the Automobile Sector
CCSD	34.2012	Baptiste Perrissin Fabert, Patrice Dumas and Jean-Charles Hourcade: What Social Cost of Carbon? A mapping of the Climate Debate
ERM	35.2012	Ludovico Alcorta, Morgan Bazilian, Giuseppe De Simone and Ascha Pedersen: Return on Investment from Industrial Energy Efficiency: Evidence from Developing Countries
CCSD	36.2012	Stefan P. Schleichner and Angela Köppl: Scanning for Global Greenhouse Gas Emissions Reduction Targets and their Distributions
CCSD	37.2012	Sergio Currarini and Friederike Menge: Identity, Homophily and In-Group Bias
CCSD	38.2012	Dominik Karos: Coalition Formation in Generalized Apex Games
CCSD	39.2012	Xiaodong Liu, Eleonora Patacchini, Yves Zenou and Lung-Fei Lee: Criminal Networks: Who is the Key Player?
CCSD	40.2012	Nizar Allouch: On the Private Provision of Public Goods on Networks
CCSD	41.2012	Efthymios Athanasiou and Giacomo Valletta: On Sharing the Benefits of Communication
CCSD	42.2012	Jan-Peter Siedlarek: Intermediation in Networks
CCSD	43.2012	Matthew Ranson and Robert N. Stavins: Post-Durban Climate Policy Architecture Based on Linkage of Cap-and-Trade Systems
CCSD	44.2012	Valentina Bosetti and Frédéric Gherzi: Beyond GDP: Modelling Labour Supply as a 'Free Time' Trade-off in a Multiregional Optimal Growth Model
ES	45.2012	Cesare Dosi and Michele Moretto: Procurement with Unenforceable Contract Time and the Law of Liquidated Damages
CCSD	46.2012	Melania Michetti: Modelling Land Use, Land-Use Change, and Forestry in Climate Change: A Review of Major Approaches
CCSD	47.2012	Jaime de Melo: Trade in a 'Green Growth' Development Strategy Global Scale Issues and Challenges
ERM	48.2012	ZhongXiang Zhang: Why Are the Stakes So High? Misconceptions and Misunderstandings in China's Global Quest for Energy Security
CCSD	49.2012	Corrado Di Maria, Ian Lange and Edwin van der Werf: Should We Be Worried About the Green Paradox? Announcement Effects of the Acid Rain Program
CCSD	50.2012	Caterina Cruciani, Silvio Giove, Mehmet Pinar and Matteo Sostero: Constructing the FEEM Sustainability Index: A Choquet-Integral Application
CCSD	51.2012	Francesco Nicolli and Francesco Vona: The Evolution of Renewable Energy Policy in OECD Countries: Aggregate Indicators and Determinants
CCSD	52.2012	Julie Rozenberg, Céline Guivarch, Robert Lempert and Stéphane Hallegatte: Building SSPs for Climate Policy Analysis: A Scenario Elicitation Methodology to Map the Space of Possible Future Challenges to Mitigation and Adaptation
ES	53.2012	Nicola Comincioli, Laura Poddi and Sergio Vergalli: Does Corporate Social Responsibility Affect the Performance of Firms?
ES	54.2012	Lionel Page, David Savage and Benno Torgler: Variation in Risk Seeking Behavior in a Natural Experiment on Large Losses Induced by a Natural Disaster
ES	55.2012	David W. Johnston, Marco Piatti and Benno Torgler: Citation Success Over Time: Theory or Empirics?
CCSD	56.2012	Leonardo Becchetti, Stefano Castriota and Melania Michetti: The Effect of Fair Trade Affiliation on Child Schooling: Evidence from a Sample of Chilean Honey Producers
CCSD	57.2012	General Ponce, Francesco Bosello and Carlo Giupponi: Integrating Water Resources into Computable General Equilibrium Models - A Survey
ES	58.2012	Paolo Cominetti, Laura Poddi and Sergio Vergalli: The Push Factors for Corporate Social Responsibility: A Probit Analysis
CCSD	59.2012	Jan Philipp Schägner, Luke Brander, Joachim Maes and Volkmar Hartje: Mapping Ecosystem Services' Values: Current Practice and Future Prospects
CCSD	60.2012	Richard Schmalensee and Robert N. Stavins: The SO2 Allowance Trading System: The Ironic History of a Grand Policy Experiment
CCSD	61.2012	Etienne Espagne, Baptiste Perrissin Fabert, Antonin Pottier, Franck Nadaud and Patrice Dumas: Disentangling the Stern/Nordhaus Controversy: Beyond the Discounting Clash
CCSD	62.2012	Baptiste Perrissin Fabert, Etienne Espagne, Antonin Pottier and Patrice Dumas: The "Doomsday" Effect in Climate Policies. Why is the Present Decade so Crucial to Tackling the Climate Challenge?
CCSD	63.2012	Ben Groom and Charles Palmer: Relaxing Constraints as a Conservation Policy
CCSD	64.2012	William A. Brock, Anastasios Xepapadeas and Athanasios N. Yannacopoulos: Optimal Agglomerations in Dynamic Economics
CCSD	65.2012	Thierry Brunelle and Patrice Dumas: Can Numerical Models Estimate Indirect Land-use Change?
ERM	66.2012	Simone Tagliapietra: The Rise of Turkey and the New Mediterranean. Challenges and Opportunities for Energy Cooperation in a Region in Transition
CCSD	67.2012	Giulia Fiorese, Michela Catenacci, Elena Verdolini and Valentina Bosetti: Advanced Biofuels: Future Perspectives from an Expert Elicitation Survey
ES	68.2012	Cristina Cattaneo: Multicultural Cities, Communication and Transportation Improvements. An Empirical Analysis for Italy

- ES 69.2012 Valentina Bosetti, Cristina Cattaneo and Elena Verdolini: [Migration, Cultural Diversity and Innovation: A European Perspective](#)
- ES 70.2012 David Stadelmann and Benno Torgler: [Bounded Rationality and Voting Decisions Exploring a 160-Year Period](#)