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ISSN: 2365-9793

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ABSTRACT

Committee Decision-Making under the Threat of Leaks*

Leaks are pervasive in politics. Hence, many committees that nominally operate under secrecy *de facto* operate under the threat that information might be passed on to outsiders. We study theoretically and experimentally how this possibility affects the behavior of committee members and the decision-making accuracy. Our theoretical analysis generates two major predictions. First, a committee operating under the threat of leaks is equivalent to a formally transparent committee in terms of the probabilities of project implementation as well as welfare (despite differences in individual voting behavior). Second, the threat of leaks causes a committee to recommend rejection of a project whenever precise information has been shared among committee members. As a consequence, a status-quo bias arises. Our laboratory results confirm these predictions despite subjects communicating less strategically than predicted.

JEL Classification: C92, D71, D82, J45

Keywords: committee decision-making, strategic communication, voting, leaks, transparency, monetary policy committees, information aggregation

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* We would like to thank Yongping Bao, Sourav Bhattacharya, Niall Hughes, Melis Kartal, Moritz Janas, Rupert Sausgruber, Maik T. Schneider, James Tremewan, Vu Dang Tuan, Nick Zubanov, and the research group at the Thurgau Institute of Economics, as well as participants at several workshops and conferences, for many valuable comments and suggestions.

1 Introduction

With the help of a formal game-theoretic analysis and an experiment, we investigate how information aggregation and voting in a committee nominally operating under secrecy are affected by the threat that confidential information that was shared in the committee may be leaked by members of the committee. This aspect, which is relevant for political and monetary-policy committees has largely been neglected in the literature.[1]

Leaks of confidential information are pervasive in politics and a recurring topic in public debate. Roughly speaking, they come in two varieties: whistle-blowing and leaks of details from policy deliberations in order to influence decision-making processes. While the first variety includes many spectacular cases (the Pentagon papers, the US diplomatic cables, and the Panama papers, to name only a few), our focus lies on the second variety, which includes a number of prominent examples as well: On April 2, 2015, WikiLeaks published records of a conference call between International-Monetary-Fund (IMF) officials discussing the Greek debt crisis, which appeared to reveal the IMF's intention to leave the Troika of the European Commission, the European Central Bank (ECB) and the IMF. On the same day, the Greek government demanded a clarification from the IMF.[2] The IMF stayed in the Troika. On May 2, 2016, Greenpeace published detailed documents that were leaked from the negotiations of the Transatlantic Trade and Investment Partnership (TTIP) and projected parts of the text onto the Reichstag in Berlin. The next day, the French president, François Hollande, announced his rejection of TTIP.[3]

To evaluate the consequences of leaks for committee decision-making, we study the following set-up. There is a decision-making body consisting of two members (type 1 and type 2), who represent groups of society with different preferences. These members have to decide whether to implement a given project. Implementation requires the support of both members. Three cases may occur. First, the project may be socially desirable according to utilitarian welfare

[1] Ghosh and Roy (2015) consider an exogenous probability of voting profiles becoming public rather than the deliberate decision of decision-makers to reveal confidential information.

[2] https://www.nytimes.com/2016/04/03/business/after-wikileaks-revelation-greece-asks-imf-to-clarify-bailout-plan.html

[3] https://www.theguardian.com/business/2016/may/03/doubts-rise-over-ttip-as-france-threatens-to-block-eu-us-deal

with large gains for member 1 but losses for member 2. Second, the project may be socially desirable and be particularly beneficial for member 2 but harmful to member 1. Third, the project may be socially harmful and be detrimental to both members.[4] The decision-makers are uninformed about the state of the world and hence consult an advisory committee which consists of experts of types 1 and 2 and an additional expert of type 3. The first two experts share the preferences of the respective decision-makers. The third expert aims to maximize utilitarian welfare.[5]

Each member of the advisory committee receives a perfectly informative signal about the state of the world with some probability. During the following deliberations, members can choose to simultaneously share their signals with the other committee members. Information is partially verifiable, so that withholding information is possible but misreporting is not. After the deliberation stage, members vote for or against a committee recommendation to the decision-making body ("invest", or "do not invest"). The recommendation is chosen by simple-majority rule. Individual votes as well as the deliberations are secret in the secrecy regime and transparent in the transparency regime. A third regime (secrecy with potential leaks) adds another stage to the secrecy setting: After the voting stage, committee members can leak information that was shared in the committee deliberations to the decision-making body.

We derive five key theoretical predictions about aggregate outcomes for the three communication regimes. These predictions rely on a number of assumptions regarding the players' strategic sophistication and regarding equilibrium selection. Whether or not they are accurate, and in how far these predictions are robust to deviations from equilibrium behavior, are empirical questions that we study in the controlled setting of a laboratory experiment.

Theoretical Prediction 1 states that more information will be shared under secrecy than under transparency and under secrecy with potential leaks, while equally much information will be

[4] Consider, for example, a two-sector economy (plus a public sector) that has to decide on a free-trade agreement with another country, and it is unclear *ex ante* which sector may benefit or get harmed by trade liberalization.

[5] As becomes clear in Section 2, the decision-making body could also have a type 3 member, in addition to the other two, but this change in its composition would not affect its decisions and the type 3 member would thus be redundant. In the trade example, the type 3 expert could represent the public sector that benefits from increased tax revenue if at least one of the private sectors benefits from the liberalization.

shared for the latter two regimes. This is supported by our experiment. Our experiment also confirms Theoretical Prediction 2, which implies that socially desirable projects are implemented much more often under secrecy than under the other two regimes if the state of the world was revealed. Moreover, our experimental results regarding overall implementation rates are compatible with Theoretical Prediction 3 about a status quo bias in the leaks regime and in the transparency regime. In line with Theoretical Predictions 4 and 5, welfare in the experiment is statistically not different between secrecy with potential leaks and transparency and highest under secrecy.

Thus the experiment largely confirms our key theoretical predictions, although many subjects deviate from equilibrium behavior and choose actions that are not best responses to the other subjects' actions.[6] First, decision-makers under transparency only respond to the votes of experts with aligned preferences and ignore the useful information contained in the other experts' votes. Second, both under transparency and under secrecy with potential leaks, experts communicate more naively than predicted and appear to ignore the fact that the information that they reveal can lead to the dismissal of projects that are desirable to them. Third, under secrecy with potential leaks, this leads to many leaks, in contrast with our theoretical analysis. The frequent leaks create additional welfare losses. We conclude that the threat of leaks should be carefully considered in institutional design.

Our paper is related to several strands of literature. The transparency of committee deliberations, members' votes, and macroeconomic forecasts has been hotly debated by central bankers (e.g., Buiter, 1999; Issing, 1999) and academics (e.g., Visser and Swank, 2007; Gersbach and Hahn, 2008; Swank et al., 2008; Swank and Visser, 2013; Fehrler and Hughes, 2018). Meade and Stasavage (2008) and Hansen et al. (2018), for example, analyze transcripts of Federal Open Market Committee meetings before and after the decision to publish minutes of the meetings. They find that debates became more scripted under transparency and that committee members became more reluctant to take positions opposing that of the Chairman.[7]

[6] Best responses are substantially more frequent under secrecy than under either transparency or secrecy with potential leaks. This suggests that best-response behavior is more intuitive under secrecy and requires less strategic sophistication than in the other two regimes.

[7] A recent example of (leaked) position-taking in a different context is the following: On July 20, 2018, *The Times* reported a leak it had received from the UK cabinet's internal deliberations of its Brexit strategy at Chequers. According to the leak, Andrea Lead-

While most of the papers in the literature on committee decision-making take the level of transparency as exogenous, we let the committee members influence the level of transparency.[8] In this respect, our set-up is loosely related to Swank et al. (2008), who discuss situations in which committee members might want to arrange secretive pre-meetings when the committee's official meetings are transparent.

Despite many incidences of leaks of classified information from monetary-policy committees and other committees, this aspect has hardly been addressed in the literature yet.[9] So far, only Ghosh and Roy (2015) have studied committee decision-making with leaks. They consider committee members with career concerns and show that there is a unique exogenous probability of the voting records being made public that facilitates informative voting under some circumstances. By contrast, we consider projects that involve conflicts of interests rather than career concerns. We focus on members' deliberate decisions to leak information that was shared during the committee meeting and the consequences of this possibility for the amount of information being shared during committee meetings and for project implementation.

In the transparency regime considered in the present paper, individual committee members' votes can be considered as cheap talk messages to receivers with potentially conflicting interests. In this sense, our set-up is related to Farrell and Gibbons (1989), Goltsman and

som, the Leader of the Commons, said she "hated" Prime Minister Theresa May's Brexit plan. A day after the Chequers meeting, Ms. Leadsom publicly said that it was "a good deal for the UK" (https://www.thetimes.co.uk/article/andrea-leadsom-chequers-plan-betrays-referendum-result-pqkhqg892, https://www.independent.co.uk/news/uk/politics/andrea-leadom-theresa-may-chequers-plan-brexit-referendum-latest-boris-johnson-david-davis-resign-a8457621.html).

[8] Further papers that study committee decision-making under different levels of transparency include Levy (2007), Gersbach and Hahn (2012), Gradwohl and Feddersen (2018), Gradwohl (2018), and Feddersen and Gradwohl (2019).

[9] Kurov et al.'s (2016) study of central bank leaks focuses on the effects on markets rather than on decision-making in the committee. News reports on leaks from the ECB, for example, include:
(i) https://www.ft.com/content/0fc79b76-5608-11e4-a3c9-00144feab7de,
(ii) https://dealbook.nytimes.com/2014/10/17/before-a-bailout-doubts-over-keeping-a-cyprus-bank-afloat/
(iii) https://www.bloomberg.com/news/articles/2017-06-07/ecb-said-to-cut-inflation-forecasts-after-energy-prices-slide
(iv) https://www.bloomberg.com/news/articles/2018-04-20/ecb-is-said-to-see-scope-to-wait-for-july-to-signal-end-of-qe
(v) https://www.bloomberg.com/news/articles/2018-06-05/ecb-is-said-to-see-june-14-as-live-meeting-to-debate-qe-exit
(vi) https://www.bloomberg.com/news/articles/2018-01-29/ecb-officials-are-said-to-keep-assumption-qe-ends-in-short-taper
(vii) https://www.bloomberg.com/news/articles/2018-04-26/draghi-is-said-to-have-faced-nowotny-plea-to-discuss-ecb-policy.

Pavlov (2011), and Battaglini and Makarov (2014), who study cheap talk in the presence of multiple audiences. In our case, communication is further complicated by the fact that there are also multiple senders with conflicting interests. To the best of our knowledge, cheap talk in the presence of conflicting interests on the sides of both senders and receivers has not been studied before.

The remainder of the paper is structured as follows. We set up the model in Section 2 and derive theoretical predictions from it in Section 3. Section 4 presents the experimental design and Section 5 our experimental results. We conclude in Section 6.

2 Model

2.1 Set-up

We consider a society consisting of three groups, 1, 2, and 3 of equal sizes. There is a project with *a priori* unknown benefits to these groups. If the project is not implemented, members of all groups obtain benefits that are normalized to 0. Moreover, there are three states of the world, 0, 1, and 2 with prior probabilities $1-q$, $\frac{1}{2}q$, and $\frac{1}{2}q$, respectively. In state 0 the project is harmful to all groups; that is, all citizens incur costs $K > 0$. In state 1 (2), members of group 1 (2) receive benefits B ($B > 0$) and members of group 2 (1) incur costs C ($C > 0$). In states 1 and 2, group 3 receives benefits $\frac{1}{2}(B-C)$. We assume that the project is not socially desirable ex ante without additional information. Accordingly, the following condition holds:

$$\frac{1}{2}q(B-C) - (1-q)K < 0 \tag{1}$$

In addition, we make the assumption that the aggregate benefits net of the costs in states 1 and 2 are positive, that is: $B > C$. It will be convenient to introduce $b := \frac{1}{2}q(B-C)$, $c := \frac{1}{2}qC$, and $k := (1-q)K$. With these equations, our parameter restrictions can be formulated as

$$0 < b < k, \tag{2}$$

$$0 < c. \tag{3}$$

We will call the project in states 1 and 2 "socially desirable." In state 0, it will be labeled "socially harmful."

There is an advisory committee comprising three experts, one from each group. Each committee member ("she") is motivated by her group's preferences. We will label the experts representing groups 1 and 2 "partisan." We will also refer to the expert from group 3 as "impartial." The final decision on the project is taken by a separate decision-making body, which contains one representative each ("he") from group 1 and 2. The project will be adopted if and only if both agree.[10]

Each of the experts has a probability p of observing the true state of the world. The event of an expert observing the state is independent of the other experts observing the state. We assume that the experts' information is partially verifiable. Each expert can demonstrate the correct state of the world if it is known to her. At the same time, it is possible to withhold information and an expert cannot prove that she has not observed the state of the world.

We look at three different regimes: secrecy, secrecy with potential leaks, and transparency. Under secrecy, the committee meeting unfolds as follows. First, in a deliberations stage, the experts can simultaneously reveal their information about the state of the world. Second, members cast votes simultaneously, where they may vote "yes," that is: in favor of project adoption or "no." The committee's overall recommendation is "yes" iff at least two experts voted "yes." Otherwise, it is "no." The committee's overall recommendation is published, and therefore known by the decision-making body. The information exchanged in the deliberations stage remains secret.

Under secrecy with potential leaks, the setting is identical to the one under secrecy with one exception: After the meeting but before the decision-making body decides whether to implement the project, each expert has the opportunity to leak the information if she knows the state of the world; that is, to make it known to all members of the decision-making body. We assume that the identity of the person who leaks the information cannot be observed.[11]

[10] As mentioned before, our results would not change (under unanimity rule) if group 3 also had a representative in the decision-making body. What is crucial is that either of the two representatives from group 1 and 2 can block the implementation if they wish to do so. As we implement the setting with a two-member decision-body in the lab, we discuss this variant in the theory part.

[11] This assumption is immaterial to our findings.

To simplify our analysis, we make the assumption that, after the meeting, experts cannot reveal information that they withheld during the meeting.[12]

If information is leaked, the expert who leaks the information incurs cost l, the other members of the advisory committee suffer a cost λ ($l > \lambda > 0$), which is meant to capture, for example, a loss in prestige if confidentiality has been breached.[13] We assume that the cost l satisfies $l < C$, which has the consequence that 1 (2) will be willing to leak the information about state 2 (1) if this enables her to prevent the project from being implemented. Under transparency, we assume that the information revealed in the deliberations stage as well as attributed voting records are disclosed.

The equilibrium concept is Perfect Bayesian Equilibrium. The following lemma will be useful for the remainder of our analysis:

Lemma 1

In all regimes, the project will never be implemented if the exact state is known to the members of the decision-making body; that is, if the information about the state has been revealed in the deliberations under transparency or if this information has been leaked by an expert.

As socially desirable projects can never be implemented when the distribution of gains and losses from the project is known, we implicitly assume that it is not possible to compensate project losers. In this sense, the political Coase Theorem fails to hold (Coase, 1973; Acemoglu, 2003). There are several reasons why this may be the case. For example, Acemoglu (2003) stresses commitment problems which make it impossible to make credible promises to compensate project losers.

Lemma 1 implies that, if expert 1 (2) knows the state to be 2 (1), she can effectively prevent the project from being adopted by revealing the state during the deliberations under transparency or leaking it under secrecy with potential leaks. As a consequence, expert 1 (2) would

[12]The assumption serves to limit the number of possible deviations. If we allowed members to leak information that they withheld in the deliberations stage, straightforward modifications of the equilibria we consider would obtain. In the experiment, we allow members to leak information that they did not reveal during the deliberations.

[13]The restriction $l > \lambda$ ensures that no expert would leak the information if she was certain that another expert leaks the information.

never reveal state 1 (2) during deliberations under secrecy with leaks. Similarly, expert 3 would never disclose states 1 and 2 in this regime.

As a consequence of these observations, we will see that the revelation of information in the deliberations stage has an entirely different effect under transparency and secrecy with potential leaks compared to secrecy. In the first two regimes, information about socially beneficial projects prevents the project from being implemented. By contrast, the revelation of information about a socially beneficial project during the deliberations under secrecy ensures the implementation of the project.

2.2 Restrictions

It is well-known that voting games typically have multiple equilibria. In the model under consideration, there would be equilibria where all experts always recommend to implement the project under secrecy irrespective of their information about the state. As no expert would ever be pivotal in the vote, no profitable deviation would exist.[14] Moreover, the recommendation of the committee represents cheap talk. In such a situation, babbling equilibria may arise where the recommendation never carries informational content. There would also be equilibria where messages have reverse meanings; that is, a recommendation to implement the project would be interpreted as suggesting that the project should not be implemented and vice versa.

To eliminate such implausible equilibria, we impose the following restrictions. First, we consider equilibria in pure strategies where experts 1 and 2 behave symmetrically. Second, we focus on equilibria where the decision-making body follows the experts' recommendation under secrecy. Under secrecy with potential leaks, the decision-making body implements the recommendation, provided that no leak has occurred. Under transparency in a situation

[14] Similarly, there would be equilibria where all decision-makers always veto the project.

where the state has not been revealed during the deliberations, the decision-makers implement the project iff expert 3 has recommended to do so; that is, voted "yes."[15]

Third, we consider equilibria with the following behavior in the deliberations stage. In all three regimes, all experts reveal state 0 if they have observed this state. These behaviors appear reasonable as there is no conflict of interests in this case. Under secrecy, expert 3 reveals both states 1 and 2, whereas expert 1 (2) discloses only state 1 (2). These behaviors appear to be plausible because the expert can ensure a majority in the voting stage by revealing the state in these cases. Under transparency, expert 3 does not reveal states 1 and 2. Expert 1 (2) reveals state 2 (1) but not state 1 (2). These behaviors are intuitive (and will be shown to be optimal) as Lemma 1 has demonstrated that the project will not be implemented if the state is known to the decision-making body. Under secrecy with potential leaks, expert 1 (2) can always leak state 2 (1), provided that she knows it, and thereby ensure that the project will not be implemented. Hence, we consider equilibria where expert 3 never discloses states 1 and 2. Expert 1 (2) does not reveal state 1 (2) but discloses state 2 (1). By disclosing information about the unfavorable state, she can demonstrate her ability to prevent the project from being implemented.

The final two restrictions apply to the voting stage in the advisory committee. They serve to rule out equilibria in which experts who would never be pivotal in the vote show implausible behavior. The fourth restriction requires sincere voting for experts who cast a minority vote in both secrecy regimes. More precisely, we eliminate equilibria in which an expert who knows that she casts a minority vote strictly prefers, based on the information available to her, the equilibrium outcome of the vote to the outcome that she votes for herself.

The fifth restriction concerns both secrecy regimes and, in the spirit of trembling-hand perfection, eliminates some implausible equilibria. Suppose that, in the voting stage, a voter knows that there is a unanimous vote with certainty in equilibrium. Then consider those other experts who, based on their information, would weakly prefer the opposite outcome of

[15] One might think that it would be desirable for experts 1 and 2 to reveal information about the projects that benefit themselves to the decision-makers with aligned preferences. However, any such information would also be revealed to the respective decision-maker with opposing preferences, who would then torpedo the project. The only expert who can reveal information about the social desirability of the project is thus the impartial expert 3.

the vote rather than the one implemented in equilibrium. Then the behavior of the expert under consideration has to be weakly optimal in all cases where one of these other experts casts the vote that differs from the one she chooses in equilibrium with small but positive probability and thereby makes the expert under consideration pivotal. Henceforth we will refer to this restriction as the "stability refinement."

Finally, we would like to stress that all assumed behaviors will be shown to constitute optimal decisions in equilibrium. Moreover, we will test in the lab whether or not these restrictions are accurate predictions for actual behavior.

3 Theoretical Findings

In this section, we first derive the equilibria for the three different regimes. As a second step, we compare these equilibria and derive five key theoretical predictions.

3.1 Equilibria

We start with the equilibrium in the secrecy regime. In Appendix A, we prove the following proposition:

Proposition 1

Under secrecy, only equilibria with the following properties exist:

1. *Suppose that* $b \in \big(0, (1-p)k\big)$. *If an expert has not observed a signal herself and if no signal has been presented, she will vote "no."*

2. *Suppose that* $b \in \big[(1-p)^3 k, k\big)$. *If an expert has not observed a signal herself and if no signal has been presented, she will vote in favor of implementation.*

In both cases, expert 3 *will vote "yes" if she knows the state to be* 1 *or* 2. *Expert* 1 *(*2*) will vote "yes" if she knows that the state is* 1 *(*2*); she will vote "no" for state* 2 *(*1*). The five restrictions that were described in Section 2.2 are compatible with optimal decisions in equilibrium.*

As shown in the proposition, two types of equilibria occur under secrecy, which differ by the voting behavior in the case where no information has been released in the deliberations stage. For sufficiently small values of b, that is, low net benefits of socially desirable projects, experts do not find it profitable to vote in favor of implementation in the absence of reliable information about the project. By contrast, for sufficiently high values of b, experts choose to support the adoption of the project in such cases.

Note that, for $b \in \big[(1-p)^3 k, (1-p)k\big)$, both types of equilibria exist. The multiplicity of equilibria can be understood by noting that votes in the absence of precise information about the state are strategic complements. Suppose, for example, that expert 1 anticipates that the other experts vote in favor of the project if they have no information. In this case, she will only be pivotal in situations where expert 2 privately knows that the project is beneficial to expert 1 and hence votes against implementation. As a consequence, voting in favor of adoption in the absence of reliable information about the state is particularly attractive if the other experts are expected to behave in the same manner.

As a next step, we analyze the transparency regime. In Appendix B, we derive the equilibria for this case.

Proposition 2

Under transparency, experts 1 and 2 vote uninformatively.[16]

1. *For $b \in (0, (1-p)k]$, expert 3 votes in favor of the project iff she has privately observed 1 or 2 and this information has not been revealed in the deliberations stage.*

2. *For $b \in [(1-p)k, k)$, expert 3 votes in favor of the project (i) if she has privately observed 1 or 2 and this information has not been revealed in the deliberations stage or (ii) if the state is unknown to her. In all other cases, she votes against project adoption.*

The five restrictions that were described in Section 2.2 are compatible with optimal decisions in equilibrium.

[16]This means that the probability of an expert voting "yes" or "no" is unaffected by the private information that she may possess.

Provided that $b \neq (1-p)k$, a unique equilibrium exists for each level of b. Following a deliberation stage where no information has been revealed, only expert 3's vote in support of the project can ensure adoption.

The equilibria for $b < (1-p)k$ and $b > (1-p)k$ differ with regard to the behavior of the impartial expert 3. In the first case, where project quality is low on average, the impartial expert votes against the project if she does not know the state. In the second case with high average project quality, she votes in favor of implementation when she is unaware of the state. Thus, for a high average quality, projects are adopted with a higher frequency than for low average quality.

It remains to analyze the third regime, secrecy with potential leaks. In Appendix C, we show the following.

Proposition 3

Consider secrecy with potential leaks. If the committee's recommendation were to implement the project despite the state 1 *(*2*) being known to expert* 2 *(*1*), then the expert would leak the information. Depending on the value of* b*, the following two behaviors may occur in the voting stage.*

1. *Suppose* $b \in (0, (1-p)k]$*. Expert* 3 *will vote in favor of the project if she does not know the state. Experts* 1 *and* 2 *will vote against the project if they do not know the state.*

2. *Suppose* $b \in [(1-p)k, k)$*. All experts who have not observed the state either directly or in the deliberations stage vote "yes."*

In both cases, all experts will vote "no," when an argument has been presented during the deliberations. Expert 3 *will vote "yes" if she privately knows the state to be* 1 *or* 2*. Expert* 1 *(*2*) will vote "yes" if she privately knows that the state is* 1 *(*2*); she will vote "no" for state* 2 *(*1*). The behaviors of all agents that were described in Section 2.2 correspond to optimal decisions in equilibrium.*

Analogously to transparency, the only difference between the case where $b < (1-p)k$ and $b > (1-p)k$ arises under secrecy with potential leaks in situations where no information has been released in the deliberations stage. For $b < (1-p)k$, the project will be adopted in this case only if the partisan expert who benefits from the project has privately observed the state of the world. For $b > (1-p)k$, the project will always be adopted when no information has been shared.

3.2 Theoretical predictions

Having established three propositions that describe the equilibria in the three regimes, we are now in a position to state several theoretical predictions that follow from these results. These predictions will later be tested in the lab. The first prediction regards information sharing about socially desirable projects in the deliberations stage.[17]

Theoretical Prediction 1

Information sharing: *Under secrecy, the probability of information about socially desirable projects being shared in the deliberations stage is higher than under transparency and secrecy with potential leaks. In the latter two cases, the respective probabilities are identical.*

The reason for the finding that information about socially desirable projects is shared less frequently under transparency as well as secrecy with potential leaks is that sharing such information would lead to the project being dismissed with certainty, which is not in the interest of the impartial expert and the partisan expert who would gain from the project. This leads us to our second theoretical prediction:

Theoretical Prediction 2

Optimality of decision, given that information about socially beneficial projects has been shared: *Under transparency and secrecy with potential leaks, socially desirable projects will not be adopted if information about them has been shared in the deliberations stage. Under secrecy, socially desirable projects will be adopted in these cases.*

[17] Information about socially harmful projects is shared with certainty in all regimes.

Because socially desirable projects will never be adopted under transparency and secrecy with potential leaks if information about the state is revealed in the deliberations, it appears plausible that these communication systems entail a status quo bias in comparison; that is, a lower frequency of project adoption.[18] This is indeed the case:

Theoretical Prediction 3

Status quo bias in the absence of secrecy: Under transparency and secrecy with potential leaks, projects are implemented with a lower probability than under secrecy. This statement also holds for socially desirable projects only.

Next we turn to the question of whether the possibility of leaks can make the decision-making process equivalent to one under transparency, despite the implication of our theory that leaks never occur in practice.

Theoretical Prediction 4

Equivalence of secrecy with potential leaks and transparency: Conditional on a particular state of the world, transparency and secrecy with potential leaks lead to identical probabilities of the project being adopted. Welfare is identical across both regimes.[19]

The finding can be understood by recalling that, according to Theoretical Prediction 1, information about socially desirable projects is shared equally often in both regimes under consideration. In addition, information about socially harmful projects is shared with certainty irrespective of the regime. Moreover, in line with Theoretical Prediction 2, the project is not adopted in both regimes whenever information has been shared. Finally, one has to focus on the decision-making outcomes in the event that no information has been revealed during the deliberations. We consider the constellations $b < (1-p)k$ and $b > (1-p)k$ separately.

First, for $b < (1-p)k$ and after no information has been shared under secrecy with potential leaks, the impartial expert always votes in favor of project adoption and the partisan expert

[18] Information about socially harmful projects always entails the dismissal of the project in all three regimes.

[19] In the knife-edge case with $b = (1-p)k$, each regime entails two equilibria. For each equilibrium under transparency there is one equilibrium under secrecy with potential leaks that implies identical outcomes with regard to project adoption and welfare.

who would be harmed by the project votes against the project. As a consequence, following no information disclosure during the deliberations, a socially desirable project is adopted if and only if the partisan expert who gains from the project has privately observed the state of the world. Under transparency, following a deliberation where no information has been presented, the project is adopted if and only if the impartial expert has observed the state of the world and can ensure adoption through her vote. As the probability of observing the state of the world is identical across experts, both constellations are equally likely. In addition, socially harmful projects are never adopted in both regimes. As a consequence, the probability of the project being adopted as well as welfare are identical across regimes. Second, for $b > (1-p)k$, all projects are adopted with certainty, conditional on no information having been shared. This establishes the claim of Theoretical Prediction 4.

Our last prediction concerns the consequences of secrecy for welfare:

Theoretical Prediction 5

Welfare consequences of secrecy: Welfare is typically higher under secrecy compared to the other regimes. Welfare may only be lower under secrecy if $b \in \left[(1-p)^3 k, \frac{(1-p)^3}{1-p+p^2}k\right)$ *and the equilibrium with lower welfare is chosen.*

The result that, in general, secrecy is superior to the other regimes is plausible. According to Theoretical Prediction 1, information about socially desirable projects is shared comparably frequently under secrecy in the deliberations stage. Moreover, following Theoretical Prediction 2, the socially optimal decision is taken with certainty, provided that such information has been shared. Taken together, both findings suggest that welfare is high under secrecy.

Nevertheless Theoretical Prediction 5 reveals that secrecy can also be harmful, provided that, for $b \in \left[(1-p)^3 k, \frac{(1-p)^3}{1-p+p^2}k\right)$, the equilibrium is chosen in which experts who have not observed the state of the world always vote in favor of adoption. In this case, the project is adopted too frequently from a social perspective. To understand this, recall that in our discussion of strategic complementarities and equilibrium multiplicity under secrecy we have highlighted that optimal individual behaviors in the voting stage are determined exclusively by constellations where experts are pivotal, which happens only in situations where one of the partisan experts withholds information about a socially desirable project. When selecting individually optimal voting behaviors, experts ignore that socially harmful projects may be adopted, as this happens when all experts vote in favor of project adoption and hence no expert is pivotal. As a consequence, individual optimization takes only the potential benefits but not the potential costs of project implementation into account.

Finally, we explain why secrecy can be harmful only if $b \in \Big[(1-p)^3 k, \frac{(1-p)^3}{1-p+p^2} k\Big)$. The lower boundary for b ensures that the net benefits of socially desirable projects are sufficiently high such that decision-makers follow the committee's recommendation. The upper boundary implies that the net benefits b are sufficiently low such that the frequent adoption of projects in cases where no information has been shared does indeed lead to welfare losses.

4 Experimental Design

To test the accuracy of our theoretical predictions, we conduct a laboratory experiment with a 3 (regimes) $\times$ 2 (scenarios) design. The regime (secrecy, transparency, or secrecy with potential leaks) is varied between subjects; the scenarios (sets of parameter values) are varied within the experimental sessions.

Parameter values For all 6 treatment conditions, we set $p = 0.5$ (that is, each advisory committee member observes the true state of the world with 50% probability). Moreover, we set $q = 0.8$ (that is, the prior probabilities of the state of the world being 0, 1, or 2 are 20%, 40% and 40%, respectively). Finally, we set the cost of implementing the project in case the state of the world is 0 to $K = 27$, and the costs of a leak to 2 for the leaker and to 1 for the other committee members.

According to our theoretical analysis, three different sets of parameters should be distinguished: a very low average project quality $b \in \big(0, (1-p)^3 k\big)$, a low project quality $b \in \big((1-p)^3 k, (1-p)k\big)$, and a high project quality $b \in \big((1-p)k, k\big)$. Theoretical Predictions 1-4 are unaffected by the parameter region, in contrast with Theoretical Prediction 5, which focuses on welfare. It may be worth stressing that, despite the fact that Theoretical Predictions 1-4 are identical for the three parameter regions, our theoretical analysis predicts different behaviors for the different regions.

Our experiment focuses on the case with high quality of projects on average (HQ) and the case with low quality (LQ). Scenario HQ enables us to verify the accuracy of the predictions from the perfect Bayesian equilibria under the additional restrictions we have introduced in Section 2.2. Scenario LQ allows us to determine the welfare consequences of the different transparency regimes in the only case where our theory does not make clear-cut predictions.

We select the following parameters for the two scenarios:

1. **HQ:** $B = 15$, $C = 5$, $K = 27$, $p = 0.5$, and $q = 0.8$. This implies $b = 4$, $c = 2$ as well as $k = 5.4$. Obviously, b lies in the interval $\big((1-p)k, k\big) = (2.7, 5.4)$.

2. **LQ:** $B = 12$, $C = 10$, $K = 27$, $p = 0.5$, and $q = 0.8$. These parameters translate into $b = 0.8$, $c = 4$, and $k = 5.4$. b is contained in $\big((1-p)^3k, (1-p)k\big) = (0.675, 2.7)$.

Procedural details To control for order effects, we divide each session into two parts and let half of the subjects start with Scenario HQ and the other half with Scenario LQ. After the first part, they receive a new short set of instructions detailing the change of parameters. In each session, subjects play 23 rounds: 13 in the first part and 10 in the second. Rounds 1-3 have the purpose of making subjects familiar with the interface and are excluded from the data analysis. Hence, we are left with data from 10 rounds of each scenario. From each of the two sets of rounds, one round is randomly selected at the end, the points that subjects earn in this round are converted into euros at a rate of 1 point = 20 Cents. To avoid negative payouts, all subjects receive an endowment of 60 points in each round.

In the beginning, subjects are randomly assigned to a matching group of 15 subjects. Within the matching groups, new groups of 5 are randomly formed before every round. Subjects stay in their role either as decision-maker or as expert throughout the session. However, in case they are a decision-maker, it is randomly determined every round whether they benefit from implementing the project in state 1 or in state 2. Likewise, in case they are an expert, it is randomly determined every round whether they benefit from implementing the project in state 1, in state 2, or in both. Subjects receive feedback about the decision and the state of the world after every round. They are informed about the randomly selected rounds and their resulting payoff after the last round. After the final feedback screen, subjects fill in a short questionnaire with questions on their socio-economic characteristics.

States (experts and decision-makers) 1 and 2 are called "light blue" and "dark blue" projects (color types) in the experiment. Expert 3 is called "medium blue," and state 0 corresponds to the "red" project. Accordingly, there are "light blue", "dark blue" and "red" signals.[20]

We collected data from 90 subjects per treatment, that is regime (see Table 1). On average, subjects were 21.3 years old (standard deviation: 2.8), 56% were female, and their field of studies varied widely (more than 15 different majors).

Table 1: Number of Matching Groups, Subjects, and Sessions

	Secrecy		Transp		Leaks	
Order Scenarios	1-2	2-1	1-2	2-1	1-2	2-1
Matching Groups	3	3	3	3	3	3
Subjects	45	45	45	45	45	45
Sessions	3		3		3	

Notes: Each session had two matching groups of 15 subjects, one starting with Scenario HQ and the other with Scenario LQ. A session lasted on average 90 minutes and average earnings were EUR 17.35, including a show-up fee of EUR 5 but excluding extra payments of EUR 5 to all subjects of three sessions that went over time (lasted more than 90 minutes). According to the LakeLab rules, subjects have to be compensated with EUR 5 for every 5 minutes above the scheduled session length.

5 Experimental Results

The discussion of our experimental result is organized in the following way. In Section 5.1, we consider participants' individual behaviors in the different stages of our games. In Section 5.2, we look at aggregate outcomes, that is: implementation rates and welfare. Finally, Section 5.3 discusses the extent to which observed behaviors are best responses and the degree to which behaviors change over time.

To preview findings from Section 5.3, most results are very stable over time and we also do not observe an effect of the order of scenarios LQ and HQ that subjects face in a session.

[20]See Appendix D for the instructions.

Therefore, we consider results for all rounds of a regime pooled in Sections 5.1 and 5.2. Throughout, when we mention statistically significant effects without further details, we refer to the 5% significance level. We present results with standard errors clustered at the subject level.[21]

5.1 Individual Behavior

5.1.1 Communication

We begin our analysis of individual behaviors by focusing on communication in the deliberation stage. Table 2 shows the relative frequencies with which signals are communicated. The differences between the two scenarios HQ and LQ are small. It is straightforward to compute that, overall, blue signals, that is, signals about socially beneficial projects, are shared 68% of the time under secrecy, 53% of the time under secrecy with potential leaks and 52% of the time under transparency. In pairwise comparisons, the share is significantly higher under secrecy than under each of the other two regimes. The difference between transparency and secrecy with potential leaks is not significantly different (t-tests). These results also hold for the two scenarios HQ and LQ separately.

We summarize these findings as

Result 1

Information sharing: Our experiment entails two findings, which are in line with Theoretical Prediction 1. First, information about socially desirable (blue) projects is shared significantly more often under secrecy than under the other regimes. Second, the difference between transparency and secrecy with potential leaks is insignificant in this regard.

While the experiment supports Theoretical Prediction 1, we also observe clear deviations from equilibrium behavior. Under transparency and secrecy with potential leaks, many subjects share signals about socially beneficial projects that are desirable to them even though this might induce the players who oppose the project to prevent its implementation.

[21]We also compute standard errors with clustering at the matching-group level and find that not a single test decision is different. As the number of matching groups per treatment is only 6, it is not clear which clustering level is to be preferred. However, our results are robust to changing the level of clustering.

Table 2: Communication of Signals

	HQ			LQ		
	Secrecy	Transparency	Leaks	Secrecy	Transparency	Leaks
Own blue signal	87.50	33.33	56.25	87.10	44.62	51.95
	(4.89)	(6.71)	(7.88)	(5.03)	(7.61)	(6.59)
Other blue signal	17.58	40.00	17.50	16.88	33.33	17.95
	(5.48)	(6.94)	(5.24)	5.00)	(7.39)	(5.56)
Any blue signal	89.04	48.72	52.63	84.00	38.60	64.63
(impartial expert)	(4.02)	(7.01)	(7.66)	(5.28)	(7.42)	(6.08)
Red signal	92.06	91.30	90.79	90.19	91.14	91.30
	(4.09)	(4.23)	(4.10)	(4.83)	(3.95)	(4.08)

Notes: Frequency a signal is communicated in per cent. Standard errors (in parentheses) are clustered at the subject level. "Blue" signals indicate either state 1 or 2, "red" signals state 0. "Own blue" means that a partisan expert has observed a socially desirable project that is beneficial to her. "Other blue" means that it is harmful to her.

5.1.2 Voting behavior in the advisory committee

Table 3 displays voting behaviors in the advisory committees. As a first step, we discuss voting behaviors in situations where the state of the world is publicly known when experts cast their votes. In line with our expectations, most experts vote against recommending implementation if they know that implementation would harm them. When the state of the world is known to be their favorite state (or either blue state for the impartial expert), almost every expert votes to recommend the project's implementation. Under secrecy with potential leaks, this is against our equilibrium predictions. According to our theoretical analysis, voting in favor of recommendation is not optimal in this case as the recommendation can be undermined by the opposing expert's leak to the decision-making body, which involves costs for all committee members.

As a second step, we consider situations where the state of the world is not publicly known after the deliberation stage. In these cases, most experts vote for implementation if they have private information indicating that they would benefit from implementation, and against it if they have private information indicating that they would suffer from implementation.

Surprisingly, we also observe that a number of experts vote in favor of recommending implementation of a blue project that is detrimental to them. Finally, we see that more than 50% vote in favor of implementation if they have no signal. In Scenario LQ, this number is a bit lower, in particular under secrecy with potential leaks.

Table 3: Votes for Recommending Implementation in the Advisory Board (in per cent)

	HQ			LQ		
	Secrecy	Transparency	Leaks	Secrecy	Transparency	Leaks
SOTW publicly known						
SOTW own blue	98.94	98.70	100	97.94	96.67	98.89
	(1.08)	(1.35)	(0)	(1.43)	(2.38)	(1.11)
SOTW other blue	4.26	14.67	11.59	2.06	6.67	5.56
	(3.33)	(5.53)	(4.47)	(1.45)	(3.83)	(2.85)
SOTW any blue	96.81	92.00	97.10	95.88	86.67	94.44
(impartial expert)	(2.26)	(4.25)	(1.95)	(3.15)	(6.75)	(2.35)
SOTW red	1.85	3.85	2.22	3.33	1.63	5.56
	(1.32)	(2.81)	(1.65)	(1.91)	(1.13)	(2.92)
SOTW not publicly known						
Own blue signal	100	100	100	100	91.67	100
	0	0	0	0	(6.02)	0
Other blue signal	47.92	35.48	37.72	31.00	32.82	19.05
	(5.66)	(5.00)	(4.86)	(5.63)	(5.14)	(4.63)
Any blue signal	83.67	83.54	89.39	64.15	77.22	73.33
(impartial expert)	(6.38)	(5.33)	(4.37)	(7.03)	(6.24)	(6.04)
Red signal	0	0	0	0	0	0
	0	0	0	0	0	0
No signal	68.60	57.14	65.11	50.00	52.20	38.26
	(5.05)	(5.35)	(4.22)	(5.59)	(5.18)	(4.64)

Notes: SOTW = State of the world. Standard errors (in parentheses) are clustered at the subject level. "Blue" signals (SOTWs) indicate either state 1 or 2, a "red" signal (SOTW) state 0. "Own blue" means that a partisan expert has observed a socially desirable project that is beneficial to her. "Other blue" means that it is harmful to her.

5.1.3 Leaks

In contrast with our equilibrium predictions, we observe that, in almost every second round, at least one expert chooses to leak information.[22] In rounds in which the state of the world is blue, a leak occurs in 46.6% of all cases. It appears plausible that this a consequence of two observations we have discussed before. First, during the deliberations, experts behave differently than predicted and communicate information about projects that they would like to see implemented. In doing so, they appear to ignore the possibility that information sharing may enable experts opposing the project to use leaks in order to prevent implementation. Second, experts who would benefit from the project recommend implementation when the state of the world is known, again ignoring the possibility that this might trigger leaks.

When the state of the world is red, leaks occurs in 49.4% of rounds. Apparently, this is partly due to the fact that experts wish to rule out the possibility that the decision-makers choose implementation despite a recommendation against the project. Overall, information is leaked in 35.5% of all cases in which the advisory board advises against implementation.

5.1.4 Voting in the decision-making body

Finally, we turn to the voting behavior in the decision-making stage. Unsurprisingly, decision-makers who get to know that the project is their preferred one, almost always (in 99% of cases) vote for implementation and almost never when they know that implementation harms them (in 5.4% of cases).

Table 4 focuses on the more interesting cases in which the decision-makers do not know the state with certainty. Our theoretical analysis suggests that they should follow the advisory board's recommendation under secrecy and secrecy with potential leaks. Indeed, most decision-makers follow the recommendation. However, we will see in Section 5.2 that the lower shares in Scenario LQ result in substantially lower implementation rates because implementation requires the unanimous support of both decision-makers. Under transparency, where the experts' individual votes are observable, decision-makers condition their vote mainly on

[22] As is plausible, the impartial experts leak much less often than the partisan ones.

the vote of the expert with aligned preferences. We discuss this interesting observation in more detail in Subsection 5.3.

Table 4: Voting in the Decision-Making Body with unknown SOTW

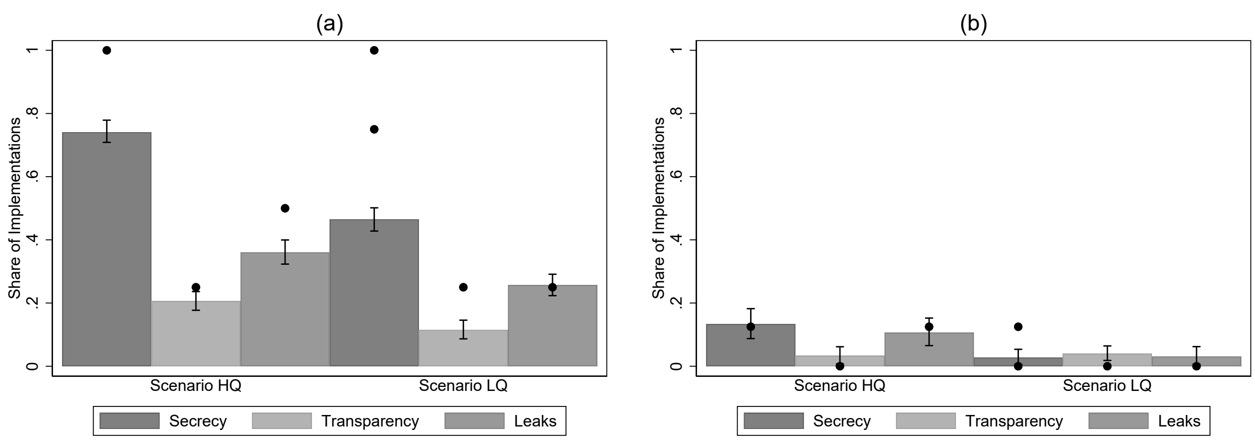
	Secrecy	Transparency	Leaks
SOTW unknown in x% of votes	100	44	53
HQ	90.87	62.28	88.60
Vote with Recommendation (in %)	(2.62)	(5.31)	(2.95)
LQ	77.27	56.25	82.95
Vote with Recommendation (in %)	(4.87)	(6.43)	(5.88)

Notes: SOTW = State of the world. Standard errors (in parentheses) are clustered at the subject level.

5.2 Aggregate decisions and welfare

Having analyzed the agents' individual behaviors, we now turn to the resulting implementation rates and aggregate welfare.

Figure 1: Share of Implemented Projects



Notes: The figure shows the share of implemented socially desirable projects (panel a) and of harmful projects (panel b) across regimes and scenarios, their 95% confidence intervals (based on the bootstrap with 10,000 repetitions and clustering at the subject level) and the theoretical point predictions (the black dots). Recall that there are two equilibria for secrecy in Scenario LQ.

5.2.1 Project implementation

Figure 1 shows the implementation rates of socially desirable (panel a) and harmful projects (panel b) separately. The pairwise differences between implementation rates for socially desirable projects and for socially harmful projects are significant between all three regimes (F-tests) when both scenarios are pooled and when they are considered separately.

Turning to socially harmful projects (panel b), we see significant differences in Scenario HQ between secrecy and transparency as predicted but not between secrecy and secrecy with potential leaks. In Scenario LQ, there are no significant differences between the regimes with respect to the implementation rates of harmful projects.

Comparing implementation rates for socially beneficial projects across regimes, given that information has been shared, yields our next result:

Result 2

Optimality of decision, given that information about socially beneficial projects has been shared: In line with Theoretical Prediction 2, when information about socially desirable projects has been shared in the deliberation stage, adoption rates under transparency and secrecy with potential leaks are much lower than under secrecy.

The low adoption rate under transparency when information about socially beneficial projects has been shared (6.4%) is a direct result of the described voting pattern in the decision-making body. Under secrecy with potential leaks, our theoretical analysis suggests that implementation rates are low because, in cases where the partisan expert who opposes a socially desirable project is aware of the state of the world, the advisory board votes against project adoption and the decision-makers follow this recommendation. As we have seen, this mechanism is much less relevant in our experiment. However, the frequent leaks still prevent many project adoptions and the implementation rate is only 19.2%, which is significantly lower than the 53% that we observe under secrecy.

To examine Theoretical Prediction 3 of a status quo bias, we focus on overall implementation rates for given regimes and scenarios in Table 5. By comparing implementation rates across

Table 5: Project Implementation Rates

	Secrecy	Transparency	Leaks
HQ	58.89	17.78	29.44
	(3.92)	(3.19)	(3.16)
LQ	37.78	9.44	21.67
	(4.10)	(2.55)	(2.85)

Notes: Standard errors (in parentheses) are clustered at the subject level.

communication regimes for given scenarios, we notice that the absence of secrecy results in a status quo bias in our experiment as well:

Result 3

Status quo bias in the absence of secrecy: In line with Theoretical Prediction 3, we find that, under transparency and secrecy with potential leaks, projects are implemented with a lower frequency than under secrecy; this is also the case for socially desirable projects only.

It is also instructive to compare implementation rates for secrecy with potential leaks and transparency, as Theoretical Prediction 4 implies that these rates should be identical across both regimes:

Result 4

Project implementations under secrecy with potential leaks and transparency: In contrast to Theoretical Prediction 4, we find that more projects are adopted under secrecy with potential leaks than under transparency.

At least to some extent, the low implementation rates under transparency are driven by the fact that, whenever the state of the world is unknown, individual decision-makers follow the votes of different experts, namely the partisan experts with aligned interests. As the unanimity rule is used in the decision-making body, this implies that the project tends to be rejected whenever the partisan experts choose conflicting votes.

5.2.2 Welfare

Finally, we turn to aggregate welfare in Table 6, where we take into account only the costs and benefits of project adoption but not the costs of leaks. This appears reasonable because our theoretical analysis suggests that the welfare differences between regimes are not driven by the costs stemming from leaks. Moreover, the costs stemming from leaks are borne only by the committee members and would thus be negligible for the groups in society that they present in the model.

For Scenario HQ, the theoretical prediction for the welfare ranking is $W^S > W^L = W^T$, where the superscripts S, L, and T stand for the regimes secrecy, secrecy with potential leaks, and transparency. In line with this, welfare under secrecy is significantly higher than under secrecy with potential leaks as well as under transparency, whereas the welfare difference between transparency and secrecy with potential leaks is not statistically significant (F-tests). Note that welfare under secrecy with potential leaks would be even lower if we included the costs of leaks into our welfare measure.[23]

For Scenario LQ, our theoretical prediction is again $W^L = W^T$ but, depending on the equilibrium chosen, secrecy may be either socially worse or socially better than the other two regimes. Again we find that welfare is highest under secrecy (see Table 6). However, no comparison between any pair of the three regimes involves significant differences (F-tests).

We summarize these findings as follows:

Result 5

Welfare: *In line with Theoretical Prediction 5, welfare in scenario HQ is higher under secrecy compared to the other regimes. In scenario LQ, the differences are not statistically significant. In line with Theoretical Prediction 4, there is no significant welfare difference between transparency and secrecy with potential leaks for both scenarios.*

[23]Taking into account also the costs of leaks in the welfare computation for secrecy with potential leaks, welfare drops to 0.19 for Scenario HQ and to -1.61 for Scenario LQ.

Table 6: Welfare in the Experiment

	Welfare		
	Secrecy	Transparency	Leaks
HQ	4.49	1.29	1.74
(prediction: $W^S > W^L = W^T$)	(.62)	(.44)	(.68)
LQ	.44	$-.25$	.07
(prediction: $W^L = W^T$)	(.33)	(.28)	(.36)

Notes: Welfare is computed on the basis of the observed implementation rates of good and bad projects weighted with the theoretical probability of facing either type of project. Standard errors (in parentheses) are clustered at the subject level.

5.3 Further Analyses

Our experiment has revealed a number deviations from equilibrium behavior. In the following, we take a closer look at the most striking deviations and analyze which of them might be explained as a best-response to the behavior of the other subjects. Moreover, we consider the extent to which subjects learn over time.

5.3.1 (Best) responses

Secrecy Our equilibrium predictions are largely supported in the data. More than 90% of all experts report a red signal in the deliberation stage. Between 80% and 90% of experts communicate a blue signal if it indicates their preferred state, or in the case of an impartial expert, any blue signal. Around 83% of experts stay silent when their signal indicates the blue state that does not coincide with their preferred state of the world (see Table 2).

The deliberation behavior of most subjects is a best-response to the voting behavior in both bodies: More than 95% of impartial and benefiting experts vote for recommending implementation when the state is known to them but only 68% in Scenario HQ and 50% in Scenario LQ when it is not; nobody votes for implementation if the state is known to be red (see Table 3); and the vast majority of decision-making bodies follows the advisory committee's recommendation.

However, under secrecy, 17% of subjects make the implementation of socially desirable projects that are harmful to them more likely by revealing information about these projects during the deliberations. Moreover, around 9% of subjects withhold a red signal, which increases the risk that a socially harmful project will be implemented. These subjects clearly do not play a best-response.

Transparency Across situations and expert types, between one third and one half of the experts reveal their signal if it indicates their preferred state, or any blue signal in the case of an impartial expert (see Table 2). This is clearly not a best-response as almost all decision-makers vote against implementation when they know that they do not benefit from implementation.

In case no information was revealed in the deliberation stage, more than 90% of benefiting experts who know the state of the world vote for recommending implementation, but only one third of the experts who do not benefit (see Table 3). Hence, the voting behavior is informative about the state of the world.

Table 7: Following Partisan Advice Only

Recommendation by		
aligned expert	0.620***	(0.069)
opposed expert	-0.050	(0.065)
neutral expert	-0.023	(0.081)
advisory committee	-0.039	(0.075)
_cons	0.313***	(0.087)
N	316	
R^2	0.39	
N_clust	36	

Notes: Linear Probability Model with the decision-maker's vote for implementation under transparency when the state is not known as dependent variable. * p<0.10, ** p<0.05, *** p<0.01. Standard errors (in parentheses) are clustered at the subject level.

Interestingly, decision-makers only listen to the expert with the same preferences if the state of the world was not revealed in the deliberation stage. For this analysis, we regress the decision maker's vote on the recommendation of the committee and the vote of the individual committee member that shares their preferences, the committee member with opposed preferences, and the impartial expert (see Table 7). Only the aligned committee member's vote has a (strong) influence on the decision maker's vote, while all other coefficients are close to zero and statistically insignificant. Hence, the voting behavior in the advisory board is, in fact, a best-response to the behavior of the decision-makers. However, the decision-makers clearly do not best-respond to the voting behavior of the other two experts.

Secrecy with potential leaks In Table 2, we see that between 50% and 65% of experts report signals indicating their own preferred state, or any blue state in the case of an impartial expert. These revelations increase the chance of a committee recommendation of implementation as both the impartial and the benefiting expert almost always vote for recommending implementation (see Table 3). However, they also increase the chance of a leak, which lead to a rejection of the project by the decision-making body almost with certainty. But, the partisan experts leak less often than they could to avoid the implementation of projects that harm them. In only 60% of the cases in which a partisan expert knows the state of the world, it is bad for her but good for the others, and the committee recommends implementation, information is leaked. This is clearly not a best-response. Apparently, some experts are reluctant to try to prevent the implementation of a socially beneficial project. However, we do not see the same reluctance on the side of decision-makers. The costs of leaking, even if small, might offer an explanation for the behavioral differences between the two groups.

Despite the apparent reluctance of the other experts to leak whenever they might benefit from doing so, reporting a signal indicating one's preferred state of the world at the deliberation stage is still not a best-response. When the state of the world is not known, the chance of a committee recommendation for implementation is still high: The other expert who benefits from implementation might also have received the signal and would then vote for recommending implementation with a very high probability; or one or both of the other experts might have received no signal and vote for recommendation with 65% and 38%

probability in Scenarios HQ and LQ respectively. In 80-90% of the cases, the decision-making body follows the recommendation if the state of the world is not revealed, while it only follows the committee's recommendation in 3.5% of cases after a leak. Overall, the probability that the project will be implemented is 7 (10) percentage points higher in Scenario HQ (LQ) if an expert keeps a signal indicating that she would benefit from implementation to herself, in the deliberation stage. Moreover, doing so reduces the risk of incurring the costs from a leak.

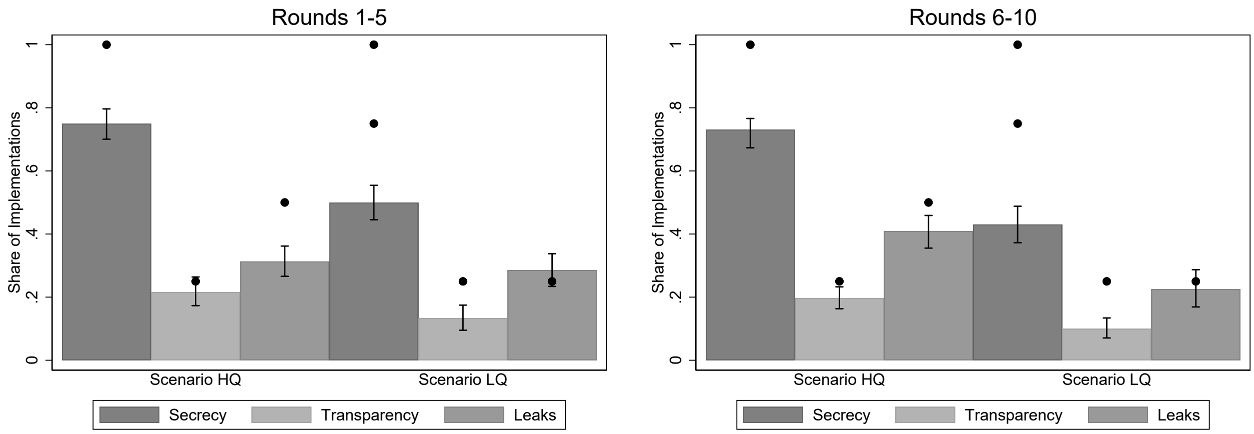
Comparison We see that the relative frequencies of best-response behavior in the deliberation stage differs between treatments. To quantify these differences, we simply count the number of best-responses and non-best-responses in the deliberation-stage situations in which a committee member received a signal (without a signal there is no choice to make). We find that 87% of all decisions to send a message or keep the information private are best-response behavior under secrecy, whereas the respective frequencies of best responses under transparency and under secrecy with potential leaks are 61% and 46%. All pairwise treatment comparisons are statistically significant. This suggests that best-response behavior is most intuitive under secrecy, whereas it requires more strategic sophistication under transparency and, even more so, under secrecy with potential leaks.

5.3.2 Behavior over time

To see how behavior changes over time and to get an idea of whether subjects learn and error rates go down correspondingly, we compare the results from the first five rounds of a scenario with the results from the last five rounds in the same scenario. We focus on aggregate results and the most salient deviations from individual equilibrium behavior described in the previous subsection.

Implementations Averaged over all regimes, implementation rates of harmful projects go down from 10.7% to 2.5% between rounds 1-5 and rounds 6-10. The fraction of socially beneficial projects being implemented is very stable over time (see Figure 2).

Figure 2: Share of Implemented Beneficial Projects over Time



Notes: The figure shows the share of implemented socially desirable projects in the first five rounds of a scenario and the second half, across regimes and scenarios, their 95% confidence intervals (based on the bootstrap with 10,000 repetitions and clustering at the subject level) and the theoretical point predictions (the black dots). Recall that there are two equilibria for secrecy in Scenario LQ.

Communication and voting under transparency The share of experts who communicate a signal indicating that they would benefit from implementation, which includes the impartial experts who communicate any blue signal, drops by 17 percentage points between rounds 1-5 and rounds 6-10. While this indicates learning on behalf of the experts, the decision-makers' behaviors for the situations where the state of the world is not revealed during the deliberation stage remain largely unchanged. Both in the first and second half of the ten rounds in a scenario, they only base their decision on the vote of the aligned expert, even though that of the opposed expert is equally informative and that of the impartial expert is informative as well.

Communication and leaking under secrecy with potential leaks In the group of partisan experts who have observed a signal indicating that they would benefit from implementation, the fraction of experts who communicate this signal drops by 16 percentage points between rounds 1-5 and rounds 6-10. Unlike under transparency, the share of impartial experts revealing information about socially desirable projects during the deliberations stage does not drop under secrecy with potential leaks. We also do not observe a change in the frequency of leaks in situations where experts can benefit from leaking. It stays close to 60% throughout (59% in rounds 1-5 and 61% in rounds 6-10).

6 Conclusions

Leaks are a prominent topic in public debate but have, so far, hardly been studied in the academic literature. To help filling this gap, we set out to study committee decision-making under the threat of leaks.

Our main theoretical result is the prediction of a status-quo bias: Fewer projects will be implemented when leaks are possible. In this respect, the threat of leaks is predicted to have the same aggregate-level effects as transparency. The status-quo bias arises from impeded information exchange in the advisory committee's deliberation phase. For fear of leaks, committee members are predicted to hold back information more often than under secrecy.

Empirically, we find support for four out of five theoretical predictions, including the status-quo bias, and partial support for the fifth. However, we also find frequent deviations from equilibrium behavior. Most importantly, subjects share much more information under transparency and secrecy with potential leaks than predicted. Interestingly, under transparency we find that the decision-makers only follow the advice of the expert with aligned preferences in case the state was not revealed even though the advice of the other experts is equally informative. These behaviors are clearly not best-responses to the behavior of the other subjects. Comparing the rates of best responses in the deliberation stage between treatments, we find that subjects play best responses much more frequently under secrecy than under either transparency or secrecy with potential leaks, where best-response behavior is more subtle and less intuitive.

Despite these deviations, we can conclude in line with our theoretical results that deliberation and decisions are very different when leaks are possible than when this is not the case. Moreover, the differences between secrecy and transparency largely vanish when leaks are possible. These results highlight the importance of considering the possibility of leaks in organizational design.

Future studies could shed more light on the topic, for example, by analyzing different collective choice set-ups. We analyze a set-up with different preferences regarding the collective decision. However, the threat of leaks could also play an important role in settings with career concerns, in which leaks could affect a principal's belief about the committee members' types. It might also be of interest to evaluate the effects of leaks in different information structures, for example, in settings where information is not verifiable.

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A Proof of Proposition 1 (Secrecy)

A.1 Optimal behavior in the decision-making stage

First, we derive a condition under which it is optimal for the decision-makers to follow the expert committee's recommendation under secrecy. We use ρ^S for the probability of experts 1 and 2 voting "yes," that is in favor of the project, in a situation where they have not observed the state themselves and where the state has not been revealed during deliberations. The respective probability for expert 3 is denoted by μ^S. The superscript "S" stands for secrecy.

The decision-makers have to take the probabilities of states 0, 1, 2 into account, conditional on the committee advising adoption or rejection of the project. The probability of the state being 1, conditional on the committee recommending to adopt the project, is

$$P_1^S = \frac{\frac{1}{2}q\left[1-(1-p)^2+(1-p)^2p\rho^S\mu^S+(1-p)^3\left(\mu^S(1-(1-\rho^S)^2)+(1-\mu^S)(\rho^S)^2\right)\right]}{Q}, \tag{4}$$

where Q is the prior probability of the committee recommending adoption. The expression is straightforward to interpret. We note that $1-(1-p)^2$ is the probability of expert 1 or 3 or both observing the state, which results in them revealing the state during the deliberations and thus the committee recommending to adopt the project. $(1-p)^2p\rho^S\mu^S$ is the probability that neither expert 1 nor expert 3 but expert 2 observe the state and that experts 1 and 3 recommend adoption. Finally, $(1-p)^3\left(\mu^S(1-(1-\rho^S)^2)+(1-\mu^S)(\rho^S)^2\right)$ is the probability that no expert observes the state but that a majority of experts vote "yes" in the voting stage.

It is clear that the corresponding probability for state 2 is identical; that is, $P_1^S = P_2^S$. As can be shown easily, the probability of the state being 0 in the situation under consideration is

$$P_0^S = \frac{(1-q)(1-p)^3\left[\mu^S(1-(1-\rho^S)^2)+(1-\mu^S)(\rho^S)^2\right]}{Q}. \tag{5}$$

The gain in utility from following the committee's recommendation to adopt the project compared to not adopting it is given by

$$\tilde{\Delta}_{DM}^S := P_1^S B - P_2^S C - P_0^S K. \tag{6}$$

We note that the expected gain in utility $\tilde{\Delta}^S_{DM}$ is independent of the decision maker's identity.

Hence it is beneficial to follow the committee's recommendation to adopt the project if $\Delta^S_{DM} \geq 0$, where Δ^S_{DM} is identical to $\tilde{\Delta}^S_{DM}$ up to a positive factor, and given by

$$\begin{aligned}\Delta^S_{DM} := &\left[1-(1-p)^2+(1-p)^2p\rho^S\mu^S+(1-p)^3\left(\mu^S(1-(1-\rho^S)^2)+(1-\mu^S)(\rho^S)^2\right)\right]b\\ &-(1-p)^3\left[\mu^S(1-(1-\rho^S)^2)+(1-\mu^S)(\rho^S)^2\right]k.\end{aligned} \tag{7}$$

A.2 Optimal actions in the deliberations stage

It is straightforward to show that the assumed behaviors in the deliberations stage are optimal for all agents.

A.3 Optimal voting behavior

It is obviously profitable for all experts to vote against adoption if the state is known to be 0.[24] Moreover, voting "yes" is profitable for expert 3 when the state is known to be 1 or 2. We have to examine whether voting in favor of adoption can be profitable for experts when they do not know the state of the world. For this purpose, we have to calculate the probabilities of all constellations where an expert would cast the pivotal vote.

We begin our analysis by considering the optimal vote of expert 3. Conditional on no expert having revealed the state and expert 3 not knowing the state, the probability of the state being 0, expert 1 voting "yes" and expert 2 voting "no" is

$$P^S_{0yn.} = \frac{(1-q)(1-p)^3\rho^S(1-\rho^S)}{(1-q)(1-p)^3+q(1-p)^2}. \tag{8}$$

Conditional on no expert having revealed the state and expert 3 not knowing the state, the probability of the state being 1, expert 1 voting "yes" and expert 2 voting "no" is

$$P^S_{1yn.} = \frac{\frac{1}{2}q(1-p)\rho^S\left(p+(1-p)(1-\rho^S)\right)(1-p)}{(1-q)(1-p)^3+q(1-p)^2}. \tag{9}$$

[24]Our stability refinement eliminates constellations where all experts vote in favor of adoption if the state is known to be 0. Our requirement that minority votes must be sincere eliminates equilibria where exactly two experts vote against the project in this case.

The respective probability of the state being 1, expert 1 voting "no" and expert 2 voting "yes" is given by

$$P^S_{1ny.} = \frac{\frac{1}{2}q(1-p)(1-\rho^S)(1-p)\rho^S(1-p)}{(1-q)(1-p)^3 + q(1-p)^2}. \tag{10}$$

Due to the symmetry of the problem, we obtain the following probabilities for the remaining constellations: $P^S_{0ny.} = P^S_{0yn.}$, $P^S_{2ny.} = P^S_{1yn.}$, and $P^S_{2yn.} = P^S_{1ny.}$.

After these preparations, we can state the gain in utility that expert 3 expects to achieve by voting "yes" rather than "no" in a situation where she has not observed the state and the other experts have not released the state during the deliberations as

$$\tilde{\Delta}^S_3 = \frac{1}{2}(B-C)\left(P^S_{1yn.} + P^S_{1ny.} + P^S_{2yn.} + P^S_{2ny.}\right) - \left(P^S_{0yn.} + P^S_{0ny.}\right)K. \tag{11}$$

It is straightforward to derive that this expression is proportional to

$$\Delta^S_3 = \left[-2(1-p)(1-\rho^S)(k-b) + pb\right]\rho^S. \tag{12}$$

As a next step, we examine the optimal voting behaviors of experts 1 and 2. Conditional on expert 1 not having observed the state and both other experts not having revealed the state in the deliberations stage, the probability of the state being 1, expert 2 voting "yes", and expert 3 voting "no" is

$$P^S_{1.yn} = \frac{\frac{1}{2}q(1-p)(1-p)\rho^S(1-p)(1-\mu^S)}{(1-q)(1-p)^3 + \frac{1}{2}q(1-p)^2 + \frac{1}{2}q(1-p)^3}. \tag{13}$$

For the remaining constellations, the probabilities are

$$P^S_{1.ny} = \frac{\frac{1}{2}q(1-p)(p+(1-p)(1-\rho^S))(1-p)\mu^S}{(1-q)(1-p)^3 + \frac{1}{2}q(1-p)^2 + \frac{1}{2}q(1-p)^3}, \tag{14}$$

$$P^S_{2.yn} = \frac{\frac{1}{2}q(1-p)(1-p)\rho^S(1-p)(1-\mu^S)}{(1-q)(1-p)^3 + \frac{1}{2}q(1-p)^2 + \frac{1}{2}q(1-p)^3}, \tag{15}$$

$$P^S_{2.ny} = \frac{\frac{1}{2}q(1-p)(1-p)(1-\rho^S)(1-p)\mu^S}{(1-q)(1-p)^3 + \frac{1}{2}q(1-p)^2 + \frac{1}{2}q(1-p)^3}, \tag{16}$$

$$P^S_{0.yn} = \frac{(1-q)(1-p)^3\rho^S(1-\mu^S)}{(1-q)(1-p)^3 + \frac{1}{2}q(1-p)^2 + \frac{1}{2}q(1-p)^3}, \tag{17}$$

$$P^S_{0.ny} = \frac{(1-q)(1-p)^3(1-\rho^S)\mu^S}{(1-q)(1-p)^3 + \frac{1}{2}q(1-p)^2 + \frac{1}{2}q(1-p)^3}. \tag{18}$$

Provided that expert 1 did not observe the state and none of her colleagues revealed the state during the deliberations, her expected gain in utility when voting "yes" is

$$\tilde{\Delta}_1^S = \left(P_{1.yn}^S + P_{1.ny}^S\right) B - \left(P_{2.yn}^S + P_{2.ny}^S\right) C - \left(P_{0.yn}^S + P_{0.ny}^S\right) K. \tag{19}$$

Up to a strictly positive factor, this expression is equal to

$$\Delta_1^S = \mu^S p(b+c) - (1-p)\left[(1-\rho^S)\mu^S + \rho^S(1-\mu^S)\right](k-b). \tag{20}$$

To apply our stability refinement and the requirement that minority votes are sincere, we need to examine the conditions under which agents would prefer an alternative outcome of the vote in situations where where no information has been shared. Let $\mathcal{P}_s^S$ be the probability of the state being s from expert 3's perspective, conditional on no information having been released in the dissemination stage. We obtain

$$\mathcal{P}_1^S = \mathcal{P}_2^S = \frac{\frac{1}{2}q(1-p)^2}{q(1-p)^2 + (1-q)(1-p)^3}, \tag{21}$$

$$\mathcal{P}_0^S = \frac{(1-q)(1-p)^3}{q(1-p)^2 + (1-q)(1-p)^3}. \tag{22}$$

Hence expert 3 would prefer a recommendation by the expert committee if

$$\frac{1}{2}(B-C)\left(\mathcal{P}_1^S + \mathcal{P}_2^S\right) - \mathcal{P}_0^S K > 0.$$

This is equivalent to

$$b > (1-p)k. \tag{23}$$

Next let $\mathcal{Q}_s^S$ be the probability of the state being s from expert 1's perspective, conditional on no information having been released in the dissemination stage and expert 1 also not having observed state 2 in private. We obtain

$$\mathcal{Q}_1^S = \frac{\frac{1}{2}q(1-p)^2}{\frac{1}{2}q(1-p)^2 + \frac{1}{2}q(1-p)^3 + (1-q)(1-p)^3}, \tag{24}$$

$$\mathcal{Q}_2^S = \frac{\frac{1}{2}q(1-p)^3}{\frac{1}{2}q(1-p)^2 + \frac{1}{2}q(1-p)^3 + (1-q)(1-p)^3}, \tag{25}$$

$$\mathcal{Q}_3^S = \frac{(1-q)(1-p)^3}{\frac{1}{2}q(1-p)^2 + \frac{1}{2}q(1-p)^3 + (1-q)(1-p)^3}. \tag{26}$$

Hence expert 1 would prefer a recommendation by the expert committee if

$$B\mathcal{Q}_1^S - C\mathcal{Q}_2^S - \mathcal{Q}_0^S K > 0.$$

This is equivalent to

$$b > (1-p)k - pc. \tag{27}$$

Clearly, the identical condition obtains for expert 2.

A.4 Pure-strategy equilibria

In the following, we will consider different constellations of ρ^S and μ^S that correspond to potential pure-strategy equilibria.

<u>Constellation $\rho^S = 1$, $\mu^S = 1$</u>

We obtain $\Delta_1^S = p(b+c) > 0$ and $\Delta_3^S = pb > 0$. Moreover, $\Delta_{DM}^S = b - (1-p)^3 k$, which implies that following the committee's recommendation to adopt the project is profitable if $b \geq (1-p)^3 k$. As a consequence, $\mu^S = 1$ and $\rho^S = 1$ corresponds to an equilibrium satisfying the restrictions laid out in Section 2.2 if $b \geq (1-p)^3 k$. It may be useful to recall that each agent has a positive probability of being pivotal in the vote, as expert 1 (2) who has privately observed state 2 (1) would vote against the project.

<u>Constellation $\rho^S = 0$, $\mu^S = 1$</u>

For $\rho^S = 0$ and $\mu^S = 1$, we observe that $\Delta_1^S = b + pc - (1-p)k$ and $\Delta_3^S = 0$. As a consequence, this constellation may only correspond to an equilibrium if $b \leq (1-p)k - pc$. We note that expert 3 is always in the minority in this constellation and therefore, according to our equilibrium refinements, we have to check whether her vote is sincere. Based on her information, the equilibrium outcome; that is, rejection of the project, is strictly desirable to project adoption if $b < (1-p)k$ (compare (23)). As $b \leq (1-p)k - pc$ implies $b < (1-p)k$, the equilibrium can be eliminated with the requirement that minority votes must be sincere.

<u>Constellation $\rho^S = 1$, $\mu^S = 0$</u>

This constellation results in $\Delta_1^S = -(1-p)(k-b) < 0$. Hence it would be optimal for expert 1 (and expert 2) to deviate by voting "no." Therefore this constellation cannot be an equilibrium.

Constellation $\rho^S = 0$, $\mu^S = 0$

In this case, $\Delta_1^S = \Delta_3^S = 0$ and therefore all experts are indifferent in the voting stage if the state has not been released in the deliberations stage. This is plausible because none of the experts would be pivotal in a situation where no information was revealed during the deliberations. Moreover, we note that $\Delta_{DM}^S = (1-(1-p)^2)\, b > 0$.

As a next step, we have to analyze under which circumstances our stability refinement rules out this potential equilibrium. First, we focus on expert 1 in a situation where she has not privately observed that the state is 2. For $b < (1-p)k - pc$, no trembles have to be considered, as both expert 2 and expert 3 strictly prefer the equilibrium outcome over the alternative (for expert 3, (23) is violated; if expert 2 has observed state 1, she strictly prefers the equilibrium outcome; as (27) is violated, expert 2 also strictly prefers the equilibrium outcome if she has not observed the state in private). For $b \in [(1-p)k - pc, (1-p)k)$, only trembles of expert 2 in situations where she has not privately observed that the state is 1 have to be taken into account; that is, we examine Δ_1^S for $\mu^S = 0$ and small but positive ρ^S. In this case, $\Delta_1^S < 0$ is satisfied. For $b \geq (1-p)k$, trembles of experts 2 and 3 need to be analyzed. As before, for $\mu^S = 0$ and small but positive ρ^S, $\Delta_1^S < 0$ is satisfied. For small positive μ^S and $\rho^S = 0$, $\Delta_1^S > 0$. Hence, for $b \geq (1-p)k$, the equilibrium can be eliminated with the help of the stability requirement. Second, we focus on expert 3. Trembles by experts 1 and 2 need to be considered only if (27) holds weakly; that is, $b \geq (1-p)k - pc$. For small ρ^S, $\Delta_3^S > 0$ holds iff $-2(1-p)(k-b) + pb > 0$. We observe that $b \geq (1-p)k$ implies $-2(1-p)(k-b) + pb > 0$. To sum up, the equilibrium can be eliminated with the help of the stability refinement if $b \geq (1-p)k$. It exists for $b \in (0, (1-p)k)$. $\square$

B Proof of Proposition 2 (Transparency)

B.1 Optimal behaviors in the decision-making stage and the voting stage

The project will not be adopted by the decision-making body if the state has been released in the deliberations stage. If the state is 0, no decision-maker will be in favor of the project. If the state is 1 (2), decision-maker 2 (1) will veto the project.

As a next step, we analyze expert 3's optimal voting behavior in a situation where no argument has been released, under the assumption that all decision-makers follow expert 3's recommendation in this case. We have to distinguish between two cases. First, suppose that $b \leq (1-p)k$. In this case, it is straightforward to check that it is optimal for expert 3 to recommend project implementation iff she has observed state 1 or 2. In the absence of more precise information about the state, it is then beneficial for all groups to follow a suggestion by expert 3 to implement the project as $b > 0$. Second, suppose that $b \geq (1-p)k$. Then recommending the project is not only optimal for expert 3 if she privately knows about the project being 1 or 2 but also in cases where she has no additional knowledge about the state. This can be easily seen as follows. Let $\mathcal{R}_s$ be the probability of the state being $s \in \{0, 1, 2\}$, conditional on the events that no information was shared among committee members and that expert 3 has not privately observed the state of the world. We obtain

$$\mathcal{R}_0 = \frac{(1-q)(1-p)^3}{(1-q)(1-p)^3 + q(1-p)^2}, \tag{28}$$

$$\mathcal{R}_1 = \mathcal{R}_2 = \frac{\frac{1}{2}q(1-p)^2}{(1-q)(1-p)^3 + q(1-p)^2}. \tag{29}$$

Expert 3 benefits from the project if

$$(\mathcal{R}_1 + \mathcal{R}_2) \cdot \frac{1}{2}(B - C) - \mathcal{R}_0 K \geq 0, \tag{30}$$

which is equivalent to $b \geq (1-p)k$. It is straightforward to see that all decision-makers should follow expert 3's recommendation in such a situation as well.

B.2 Optimal behavior in the deliberations stage

It is obvious, that it is optimal for experts to reveal state 0, given that this ensures that the project will not be implemented. If state 1 or 2 are revealed in the deliberations stage, the project will not be adopted. Hence it is beneficial for expert 1 (2) to reveal state 2 (1) but not the other state. Expert 3 finds it optimal not to reveal states 1 and 2 as this would lead to the project being dismissed with certainty. □

C Proof of Proposition 3 (Secrecy with potential leaks)

C.1 Optimal decision to leak

Recall that we focus on equilibria where the decision-making body will follow the expert committee's recommendation, provided that no information has been leaked. This implies that the following decision is optimal for experts after the meeting. First, if the committee recommends implementation but expert 1 (2) has observed the information that the state is 2 (1) (either directly or indirectly in the deliberations stage), she will leak this information (recall $l < B - C$). Second, if the committee recommends rejection, it will never be optimal for experts to leak the information because this would not affect the decision-making body's decision and would involve the costs l.

C.2 Optimal behavior in the voting stage

If an expert has observed (either directly or indirectly) that the state of the world is zero, it will be optimal for her to vote against the project. If the state 1 or 2 has been revealed in the deliberations stage, all experts will vote against the project. Even an expert who would like the project to be implemented anticipates that the project will not be ultimately implemented because the expert who is opposed to the project can always prevent it from being implemented by leaking the information.

Suppose next that the state has not been revealed in the deliberations stage. Then expert 3 will vote in favor of the project if she has privately observed 1 or 2. Expert 1 (2) will support the project if she has privately observed 1 (2). We use ρ^L for the probability of experts 1 and 2 voting in favor of the project in the case where they have not privately observed the state of the world. Similarly, we introduce μ^L as the probability of expert 3 voting in favor of the project, conditional on her not knowing the state.

Next we determine the constellations under which expert 1 would find it profitable to vote in favor of the project in the situation where she did not privately observe the argument and where the other experts did not disclose the state during deliberations. The expert has to consider the different situations in which she would be pivotal. There are six such situations. First, the state could be 1, expert 2 could vote "no" and expert 3 could vote "yes," that is: in favor of the project. We use the label $1.ny$ for this constellation. Conditional on 2 and 3 being silent during deliberations, and 1 not having observed the state, the probability for this constellation is

$$P^L_{1.ny} = \frac{\frac{1}{2}q(1-p)(1-\rho^L)\left(p+(1-p)\mu^L\right)}{(1-q)(1-p)^2+\frac{1}{2}q(1-p)+\frac{1}{2}q}. \tag{31}$$

Equation (31) can be explained in a straightforward manner. We note that the denominator is the probability of no expert revealing the state in the deliberations stage, conditional on expert 1 not knowing the state. The numerator consists of the probability of the state being 1, which happens with probability $\frac{1}{2}q$, expert 2 disclosing nothing and voting "no" in state 1, which happens with probability $(1-p)(1-\rho^L)$, and expert 3 revealing nothing and voting "yes" in state 1, which occurs with probability $p+(1-p)\mu^L$.

Second, the state could be 1, expert 2 could vote "yes" and expert 3 could vote "no," which we label $1.yn$. Conditional on 2 and 3 being silent, and 1 not having observed the state, the probability of this constellation is

$$P^L_{1.yn} = \frac{\frac{1}{2}q(1-p)\rho^L(1-p)(1-\mu^L)}{(1-q)(1-p)^2+\frac{1}{2}q(1-p)+\frac{1}{2}q}. \tag{32}$$

Third, the state could be 2, expert 2 could vote "no" and 3 vote "yes." The corresponding probability is

$$P^L_{2.ny} = \frac{\frac{1}{2}q(1-p)(1-\rho^L)(p+(1-p)\mu^L)}{(1-q)(1-p)^2+\frac{1}{2}q(1-p)+\frac{1}{2}q}. \tag{33}$$

Fourth, the probability of constellation $2.yn$ is

$$P^L_{2.yn} = \frac{\frac{1}{2}q(p+(1-p)\rho^L)(1-p)(1-\mu^L)}{(1-q)(1-p)^2+\frac{1}{2}q(1-p)+\frac{1}{2}q}. \tag{34}$$

Fifth, it is also possible that the state is 0. Conditional on 2 and 3 being silent, and 1 not having observed the state, the probability of the state being 0, 2 voting "yes," and 3 voting "no" is

$$P^L_{0.ny} = \frac{(1-q)(1-p)^2(1-\rho^L)\mu^L}{(1-q)(1-p)^2 + \frac{1}{2}q(1-p) + \frac{1}{2}q}. \tag{35}$$

Finally, for the last constellation we obtain

$$P^L_{0.yn} = \frac{(1-q)(1-p)^2\rho^L(1-\mu^L)}{(1-q)(1-p)^2 + \frac{1}{2}q(1-p) + \frac{1}{2}q}. \tag{36}$$

Having determined probabilities (31)-(36), we are in a position to specify the expected gain in utility for expert 1 when voting "yes" rather than "no":

$$\tilde{\Delta}^L_1 = \left(P^L_{1.ny} + P^L_{1.yn}\right)B - \left(P^L_{2.ny} + P^L_{2.yn}\right)C - \left(P^L_{0.ny} + P^L_{0.yn}\right)K \tag{37}$$

This expression is proportional to

$$\begin{aligned}\Delta^L_1 = {} & (1-\rho^L)pb - p(1-\mu^L)c \\ & - (1-p)\left[(1-\rho^L)\mu^L + \rho^L(1-\mu^L)\right](k-b).\end{aligned} \tag{38}$$

Recall that we consider symmetric equilibria. Hence the corresponding gain in expected utility for expert 2, conditional on not having observed an argument and the other experts having remained silent in the deliberations stage, is equal to the respective gain for expert 1.

It remains to analyze the optimal voting behavior of expert 3 in the situation where she has observed no argument and the other experts have released no information in the deliberations stage. For this purpose, we have to compute the probabilities of all situations where she might be pivotal. First, the state might be 1, expert 1 might vote "yes" and 2 "no." This happens with probability

$$P^L_{1yn.} = \frac{\frac{1}{2}q(p+(1-p)\rho^L)(1-p)(1-\rho^L)}{q(1-p)+(1-q)(1-p)^2}. \tag{39}$$

Second, conditional on no expert having disclosed the state during deliberations and expert 3 not knowing it, the probability of the state being 1, expert 1 voting "no" and 2 "yes" is

$$P^L_{1ny.} = \frac{\frac{1}{2}q(1-p)(1-\rho^L)(1-p)\rho^L}{q(1-p)+(1-q)(1-p)^2}. \tag{40}$$

Fourth, for constellations $0yn.$ and $0ny.$ we obtain

$$P^L_{0ny.} = P^L_{0yn.} = \frac{(1-q)(1-p)(1-\rho^L)(1-p)\rho^L}{q(1-p)+(1-q)(1-p)^2}. \tag{41}$$

Finally, due the symmetry of equilibria, we observe

$$P^L_{2ny.} = P^L_{1yn.}, \tag{42}$$

$$P^L_{2yn.} = P^L_{1ny.}. \tag{43}$$

We can express the change in expert 3's expected utility when voting "yes" rather than "no" as

$$\tilde{\Delta}^L_3 = \left(P^L_{1ny.} + P^L_{1yn.} + P^L_{2ny.} + P^L_{2yn.}\right) \cdot \frac{1}{2}(B - C) - \left(P^L_{0ny.} + P^L_{0yn.}\right) K. \tag{44}$$

With the help of equations (39)-(43), it is straightforward to show that $\tilde{\Delta}^L_3$ is proportional to

$$\Delta^L_3 = (1 - \rho^L)\left[pb - 2(1 - p)\rho^L(k - b)\right]. \tag{45}$$

C.3 Is it optimal for decision-makers to follow the committee's recommendation?

Conditional on no leak and the committee recommending adoption, the probability of the state being 1 is

$$\begin{aligned} P^L_1 =& \frac{\frac{1}{2}q(1-p)\rho^L(1-(1-p)(1-\rho^L)(1-p)(1-\mu^L))}{Q} \\ &+ \frac{\frac{1}{2}q(1-p)(1-\rho^L)(p+(1-p)\rho^L)(p+(1-p)\mu^L)}{Q}, \end{aligned} \tag{46}$$

where Q is the probability of the committee recommending implementation and no leak occurring. The respective probability for the state being 2 is identical, that is: $P^L_2 = P^L_1$. The probability of the state being 0, conditional on the committee's recommendation and no leak, is

$$P^L_0 = \frac{(1-q)(1-p)^3\left((\rho^L)^2 + 2\rho^L(1-\rho^L)\mu^L\right)}{Q}. \tag{47}$$

The expected gain of a decision-maker, conditional on a recommendation and no leaks, if he chooses to adopt the project rather than dismiss it, is $(P^L_1 + P^L_2) \cdot \frac{1}{2}(B - C) - P^L_0 K$, which is proportional to

$$\begin{aligned} \Delta^L_{DM} =& \rho^L\left[1 - (1-p)^2(1-\rho^L)(1-\mu^L)\right]b \\ &+ (1-\rho^L)(p+(1-p)\rho^L)(p+(1-p)\mu^L)b \\ &- (1-p)^2\rho^L\left(\rho^L + 2(1-\rho^L)\mu^L\right)k. \end{aligned} \tag{48}$$

C.4 Pure-strategy equilibria

Constellation $\rho^L = 1$, $\mu^L = 1$ For $\mu^L = 1$, Δ_1 (see (38)) simplifies to

$$\Delta_1^L = (1-\rho^L)\,(b-(1-p)k) \tag{49}$$

For $\rho^L = 1$, we obtain $\Delta_3^L = 0$. Inserting $\rho^L = 1$ and $\mu^L = 1$ into (48) yields $\Delta_{DM}^L = b-(1-p)^2k$.

Hence, $\rho^L = 1$, $\mu^L = 1$ corresponds to an equilibrium where the decision-making body follows the committee's recommendation iff $b \geq (1-p)^2k$. It is stable in the sense that $\Delta_1^L \geq 0$ even for values of ρ^L slightly smaller than one if $b \geq (1-p)k$.

Constellation $\rho^L = 0$, $\mu^L = 1$ In this case, we obtain

$$\Delta_1^L = b-(1-p)k \tag{50}$$

$$\Delta_3^L = pb \tag{51}$$

$$\Delta_{DM}^L = pb \tag{52}$$

This equilibrium exists if $b \leq (1-p)k$.

Constellation $\rho^L = 1$, $\mu^L = 0$ For $\rho^L = 1$ and $\mu^L = 0$, we conclude $\Delta_1^L = -(1-p)(k-b)-pc < 0$. Hence this constellation does not correspond to an equilibrium.

Constellation $\rho^L = 0$, $\mu^L = 0$ For $\rho^L = 0$ and $\mu^L = 0$, we conclude $\Delta_3^L = pb > 0$. Hence no equilibrium with $\mu^L = 0$ and $\rho^L = 0$ exists. □

D Instructions

We include a translation of the instructions for the "secrecy with potential leaks" treatment. The instructions for the other treatments are very similar and are thus omitted.

Overview

Welcome to this Experiment. We ask you not to talk to the other participants during the course of the experiment and to switch off your cell phone and all other mobile devices.

For the participation in this session, you will be paid in cash at the end of the experiment. The payment will depend partly on your decisions, partly on the decisions of the other players and partly on chance. For this reason, it is important that you understand the instructions before the experiment starts.

In this experiment, all interactions between the participants run through the computer in front of you. You will interact anonymously. Neither your name nor the names of the other participants will be disclosed. Also for the analysis only anonymized data will be used.

The present session consists of two parts with several rounds each. At the end, two rounds (one from each part) will be randomly selected and paid out. The rounds that will not be selected will not be paid.

Your payment consists of the points that you earn in the selected rounds, exchanged into Euro, and a lump sum payment of 5 Euro for completing a questionnaire after the experiment. The exchange rate from points to Euro is as follows. Every point has a value of **20 Cents**, which means:

5 point = 1.00 Euro.

All participants are paid privately, so other participants cannot see how much you have earned.

Experiment

This experiment consists of **2 parts.** Part 1 has **13 rounds**, part 2 consists of **10 rounds.** All **23 rounds** are identical in terms of procedure.

The roles and the group

In each round you have the same role. Either you are an advisor or a decision maker. Which role you have is determined randomly in the first round.

At the very beginning, the participants are divided into two large groups of 15, which remain unchanged throughout the experiment. Within the large groups, **3 advisors** and **2 decision-makers** are randomly assigned to a **group of 5** in each round, that is you play in a newly formed group in each round. In every group, there will be one light blue, one dark blue and one medium blue advisor, as well as one light blue and one dark blue decision-maker in each round. At the beginning of each round, the advisors and the decision-makers are randomly assigned new colors.

All interactions in a round take place within your group.

Overview

In this experiment, in each round a committee of decision-makers (the decision-making body) decides on the implementation of a project, whereby the project is randomly assigned a color in each round. If the project is carried out, this influences the payout of all five group members. The amount of the payout of a group member depends on their color type (light blue, dark blue or medium blue) and the color of the project (light blue, dark blue or red).

As will be explained in more detail later, medium blue group-members benefit from the implementation of both dark blue and light blue projects. Dark blue group-members benefit from dark blue projects and suffer costs from light blue projects. Light blue group-members benefit from light blue projects and suffer losses from dark blue projects. The implementation of a red project causes costs for all group members.

The decision-makers do not receive any direct information regarding the random color of the project. The advisors, however, sometimes receive a signal that reveals the color. The advisors can exchange their information with each other and then jointly make a recommendation to the decision-making body. In other words, they act as an advisory body.

The color of the project and the signals

In each round, a color for the project is randomly selected for each group. The color is light blue or dark blue with 40% (2/5) probability and red with 20% (1/5) probability. The color is initially unknown, but with a certain probability the advisors receive a signal indicating the color of the project. This signal is always correct. For each advisor the probability of knowing the color of the project is 50%, regardless of whether the other advisors know the color or not. After the advisors have received their signals, if they have learned the color of the project, they can share this information with the other members of the advisory body.

Recommendation and forwarding of information to decision-makers

After the advisors may have received signals about the color of the project and had the opportunity to exchange them, they vote on their recommendation to the decision-making body. The recommendation is either "carry out project" or "do not carry out project" and is made by simple majority. In other words, if two or three advisors vote to carry out the project, the decision-makers are informed of the recommendation to carry out the project. Otherwise, the decision-makers are told that the advisors do not recommend that the project be carried out. However, the individual recommendations of the advisors and the exact number of votes for and against the project are not communicated to the decision-makers.

In addition, each advisor can decide individually whether, in addition to the recommendation of the advisory body, they will directly communicate the color of the project to the decision-makers, provided that it is known to him/her through his/her own signal or communication within the advisory body. If one or more advisors communicate the project color directly, these members of the advisory board incur costs of **2 points**. The other members of the advisory body who have not notified the decision-makers directly of the color of the project will incur costs of **1 point.** If none of the advisors communicates the project color directly to the decision-makers, no advisor will incur costs.

The Decision

After the advisory body has made its recommendation, and possibly one or more advisors have passed on the information about the color of the project directly to the decision-making body, the latter decides on the implementation of the project. A decision on implementation requires the agreement of both decision-makers. If one of them votes against the implementation, the project will not be implemented.

The payouts

At the beginning of each of the two parts of the experiment, each participant will receive an endowment of **60 points**. The round payouts of the group members depend on their color type, the color of the project and the decision regarding the project. For the advisors it further depends on whether information has been passed on to the advisory body. If the project is not carried out, no group member receives points from this decision. In the following we distinguish between the possible colors of the project.

Project is light blue

For a light blue color type, the round payout is calculated as follows:

$$15 \; points, if \; the \; project \; is \; implemented$$

For a dark blue color type, the round payout is calculated as follows:

$$-5 \; points, if \; the \; project \; is \; implemented$$

For a medium blue color type, the round payout is calculated as follows:

$$5 \; points, if \; the \; project \; is \; implemented$$

In addition, two points or one point will be deducted for each advisor if information has been passed on to the advisory body.

Project is dark blue

For a dark blue color type, the round payout is calculated as follows:

$$15 \; points, if \; the \; project \; is \; implemented$$

For a light blue color type, the round payout is calculated as follows:

$$-5 \; points, if \; the \; project \; is \; implemented$$

For a medium blue color type, the round payout is calculated as follows:

$$5 \; points, if \; the \; project \; is \; implemented$$

In addition, two points or one point will be deducted for each advisor if information has been passed on to the advisory body.

Project is red

For a dark blue color type, the round payout is calculated as follows:

$$-27 \ points, if \ the \ project \ is \ implemented$$

For a light blue color type, the round payout is calculated as follows:

$$-27 \ points, if \ the \ project \ is \ implemented$$

For a medium blue color type, the round payout is calculated as follows:

$$-27 \ points, if \ the \ project \ is \ implemented$$

In addition, two points or one point will be deducted for each advisor if information has been passed on to the advisory body.

What changes in the second part

In the second part, the round payouts for the different color types change, as do the probabilities of the different colored projects. You will receive information on the new values on the screen after completing the first part.

Total payout

As a reminder: At the end of the experiment, 2 rounds (one from each part) are randomly selected, the point incomes are converted into euros and paid out privately. The unselected rounds will not be paid.

On the last screen of the last round, you will see which rounds have been selected and how much you have earned in Euros.

Questions?

If you have any questions, please raise your hand. An experimenter will then come to your place. If you believe that you have understood everything well, you can start the quiz on the screen. This quiz is only to make sure that everyone has understood the instructions well. The answers will not affect your payout.