Collective Preference for Ignorance*  

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Abstract  
A committee needs to vote on a proposal that will give every member a private state-dependent payoff. Before voting, the committee can decide whether to acquire a signal about the state or to vote in ignorance. I show that ignorance is a collective decision when fractionalisation on the state-relevant dimension is larger than fractionalisation on the state-irrelevant dimension. In a dynamic setting, agents benefit if their preferred state is revealed slower. Additionally, I show that when information acquisition is a matter of collective choice, a rule that requires a larger supermajority to stop acquiring information can lead to less information acquisition. The optimal decision rule is almost always a supermajority, and larger supermajority is preferable when the ratio of individual gains to losses moves away from one in either direction. When payoffs are random, greater variance of payoffs calls for a larger supermajority, even when expected payoffs remain the same.  

Keywords: collective decision-making, voting, information acquisition, fractionalisation, supermajority  
JEL codes: D71, D72, D81, D82

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1 Introduction

Consider a town assembly that needs to decide whether to approve a proposal to build an airport near the town. The airport can be built on the east side of the town or on the west side, and a technical committee of experts will determine the appropriate location. Ex ante, each location is considered to be equally likely. Each member of the assembly has preferences over the decision on whether or not to build the airport. These depend on how much she values the additional convenience of travel, but also on the location - for example, she may oppose building the airport if her constituents live in the area. The assembly can decide when to vote on approving or rejecting the proposal - either after the the experts determine the location, or before. If the vote is taken before, the members of the assembly must make their voting decisions "in ignorance" - without knowing the actual location. If the vote is taken after the decision of the technical committee, then the members are fully informed when they decide. Will the assembly ever choose to make the decision in ignorance?

Somewhat more formally, the problem faced by the assembly can be posed as one of collective acquisition of a public signal prior to making a collective decision. A group of individuals must collectively make a binary decision by majority rule. If the decision is positive, each of them receives a private payoff that depends on the state of the world. A negative decision gives each member a zero payoff. Before making this decision, they must collectively decide (also by majority rule) whether or not to acquire information about the state. Acquiring information is costless. Under what circumstances would the group choose not to acquire information? Clearly, a group that consists of a single individual will never have a strict preference for not acquiring information, since additional information never hurts. The same is true if the assembly members have identical preferences. However, the following example illustrates a collective preference for ignorance. Suppose that the assembly consists of three members whose utilities from having the airport
in each of the locations are as follows:

<table>
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<tr>
<th></th>
<th>Payoff if built in the west</th>
<th>Payoff if built in the east</th>
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<tbody>
<tr>
<td>Anna</td>
<td>3</td>
<td>-1</td>
</tr>
<tr>
<td>Bob</td>
<td>-1</td>
<td>3</td>
</tr>
<tr>
<td>Claire</td>
<td>-1</td>
<td>-1</td>
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If the assembly votes to acquire information, then for each location, the majority of voters are against the proposal - thus, a choice to acquire information gives each agent a zero payoff. If they vote without having learned the location, then Anna and Bob each get an expected payoff of 2 if the decision is positive - hence, when the assembly votes in ignorance, the proposal is approved. Therefore, Anna and Bob will get a higher expected payoff when the information is not acquired. So they will oppose acquiring information, and the group will choose to vote in ignorance.

The result that the majority of agents prefer to make a decision without knowing its effect is driven by two factors. First, for each type of the proposal, there is a majority of agents who prefer one alternative (in this case, to reject the proposal). Second, ex ante, the majority of agents prefer another alternative (to approve the proposal). Hence, the majority of individuals may be against learning the location, because each member fears ending up on the minority side of the decision that is made when information arrives. As will be shown later, these factors are the key to understanding when the group will or will not seek information.

There are a number of ways through which a group can choose to acquire information about the effects of a decision, and a number of situations in which they choose not to. First, as the example above suggests, public projects or public sector reforms can often be approved in haste and without careful consideration or expert advice\(^1\). Additionally, information can be ac-

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\(^1\)One possible explanation for this is corruption or lobbying - members of decision-making bodies can be interested in approving or rejecting a proposal regardless of its consequences. However, as the example above suggests (and as this paper formally shows), ignorance can also be a rational collective choice even without these considerations.
quired through having more public discussion prior to making a decision, or by simply waiting longer.

On a similar note, legislatures choose to approve laws without having enough time to read them\(^2\) - in other words, they choose to deny themselves a possibility to learn more about the law on which they vote. While there may be a number of other reasons why this happens, one potential explanation is a collective preference for having less information about the consequence of passing a bill.

Finally, a majority of citizens can sometimes express support for restrictions on freedom of speech\(^3\) - this can represent collective preference for being less informed when deciding on e.g. whether to support the government. Again, various other explanations for such a phenomenon are possible, but this paper proposes an additional explanation.

A key contribution of this paper is that it provides a necessary and sufficient condition for ignorance to be a collective decision under any distribution of group members’ preferences. In general, a voter may be in favour of either type of the proposal, or opposed to either type, or she can receive a positive payoff of (various magnitude) from one type and negative payoff from the other type, etc. As the paper will show, preference for ignorance will emerge when the group is fractionalised on the state-relevant dimension more than it is fractionalised on the state-irrelevant dimension. In other words, ignorance will be a collective choice when (i) the numbers of voters who support and who oppose the proposal regardless of information are sufficiently different; and (ii), the number of voters who are in favour of the proposal under one

\(^2\)For example, in 2003 the US Congress jointly approved four bills authorising over $1 trillion in spending. These bills contained almost 3,000 pages of text, yet members had less than 48 hours to read them. Even though usual rules specify a certain minimum time for a bill to be read, these rules are often overridden - as they were in this case - by a majority decision (Baird, 2004).

\(^3\)For instance, Pietiläinen and Strovsky (2010) provide evidence that a substantial number of voters in Russia are in favour of censorship. Recent surveys conclude that over half of Russians support censorship (Vedomosti.ru, 2014). Similar opinions have been observed in a number of Latin American countries (Rodriguez, 2013).
signal but oppose it under another signal is similar to the number of agents with the opposite preferences.

The paper also looks at information acquisition decision in a dynamic setting. I examine the case in which, for each state a signal may arrive at each point in time and perfectly reveal the state. Signal arrival times correspond to jump times of a Poisson distributions with different intensities. Hence, one state of the world is revealed slower than the other. At every point in time, the group can vote to stop and adopt the proposal; otherwise, they continue waiting and acquiring information. I show that agents whose preferred state is revealed slower are better off. Furthermore, I show that a less conservative decision rule (one that requires a smaller supermajority to stop acquiring information and adopt the proposal) can lead to more conservative decisions, i.e. to more information acquisition.

I also look at several normative questions emerging in this setup. One is the effect of a rule guaranteeing availability of information regardless of the group’s preferences. The paper shows that such a commitment to transparency is weakly optimal if and only if the decision made in ignorance is different from the welfare-maximising decision. Under a utilitarian welfare function, this means that there exists a minority with a large stake in the decision, who is hurt when the majority makes a decision in ignorance. Hence, a rule establishing transparency can serve as a way to protect a minority whose members are strongly affected by the decision.

Another question is that of the choice of an optimal voting procedure to maximise the (utilitarian) expected welfare of the group. I look at the a committee that is considering a proposal which produces winners and losers. I then analyse the optimal voting threshold - the minimum number of votes in favour needed for an alternative to be accepted. It turns out that the optimal threshold is almost always above 50% - i.e. the optimal decision rule is almost always a supermajority. The exact optimal supermajority depends on the magnitude of the winners’ gains and the losers’ losses, and that this
dependence is non-monotone. Specifically, thresholds slightly above 50% are optimal when each winner gains approximately the same amount that each loser loses. When the ratio of gains to losses moves away from one in either direction, the optimal threshold becomes larger.

Furthermore, when gains from a decision are uncertain, then, everything else being equal, greater variance of payoffs means that the optimal voting rule becomes more conservative - in the sense of requiring a larger supermajority for a decision to go ahead. This happens even though the expected payoffs stay the same, and even under a utilitarian welfare function in which neither risk nor inequality play a role.

Several strands of literature are related to this study. First, much attention has been devoted to the issue of committee decision-making under imperfect information (see a survey in Gerling et al., 2005). Researchers have looked at acquisition of private information by individual members of a committee (Persico, 2004; Gerardi and Yariv, 2008; Gershkov and Szentes, 2009; Gersbach and Hahn, 2012), as well as at situations in which committee members hold private information which they can choose to exchange (Visser and Swank, 2007; Gerardi and Yariv, 2007). Unlike these studies, I consider a situation in which the information acquisition decision is made collectively, and the resulting information likewise becomes public.

Additionally, a number of papers have focused on collective search (Albrecht et al., 2010; Compte and Jehiel, 2010; Moldovanu and Shi (2013)) in which a committee can choose to acquire further information by continuing the search for another period. The benefit of having more information can, however, be outweighed by the cost of foregoing the payoff in the current period. In contrast to the collective search approach, in the current paper deciding to acquire information before deciding on a proposal does not entail any change in payoffs from the proposal. The decision to stay uninformed is driven not by payoffs that are lost when information is acquired, but purely by the effect of that information on the collective decision.
Strulovici (2010) looks at collective experimentation. In that setting, a committee makes decisions over multiple periods. In each period they can either choose an alternative that gives a certain payoff for sure, or they can vote for a risky alternative. Voters have similar preferences: the safe alternative gives them the same payoff, while the risky alternative gives zero payoff if it is of “bad” type, and positive payoff if it is of “good” type; voters initially do not know their types but can learn them through experimenting with a risky alternative. The types are distributed independently across voters. Unlike in Strulovici, in this paper the decision to acquire or not to acquire information is not reversible. Furthermore, unlike in Strulovici, in this paper a voter’s payoffs from a proposal depend on the state in a heterogeneous way - some voters may like the proposal in the first state but dislike it in the second, others can have the opposite preferences, still others can dislike the proposal in both states, and so on. Unlike prior studies, I derive necessary and sufficient conditions on the distribution of types that give rise to a collective preference for ignorance. Furthermore, I show that in a dynamic setting, an individual whose preferred state is revealed slower if better off - a result that cannot be obtained in a setting in which preferences are similar and voters do not have a preferred state.

Lizzeri and Yariv (2010) look at a jury that has a choice in every period between continuing to gather information and making a decision. Unlike this paper, they restrict attention to a setting in which jury members have preferences that are similar in a sense that everyone prefers to acquit an innocent defendant and to convict a guilty one (they do, however, differ in the degree of certainty they require to make a decision). In such a setting, information would always be acquired if it is costless; in Lizzeri and Yariv (2010) the decision to stop gathering information is driven by the fact that it is not. Unlike Lizzeri and Yariv, I look at cases in which voters do not necessarily

\footnote{Strulovici also looks at the case when types are correlated, but that case is not analysed explicitly, and the results are quite different from the results in this paper.}
prefer the same decision in each state. In such situations, ignorance can be a collective decision even when information acquisition is costless.

Fernandez and Rodrik (1991) look at adoption of reforms that have uncertain consequences. A reform that benefits some while hurting others can be rejected because of uncertainty over who will win and who will lose. Unlike Fernandez and Rodrik, I focus on the issue of when the majority will want to gain information on their potential payoffs. Furthermore, in contrast to Fernandez and Rodrik, in this paper a decision on the proposal, once made, cannot be reversed.

A line of reasoning whose logic resembles the analysis in this article is also present in sociology literature. In particular, Davison (1983), suggests the existence of third-person effect, in which individuals tend to believe that others will be influenced by public communication to a greater degree than themselves. Hence, they might support actions to restrict this communication, not because it might have an effect on themselves, but because they think it will influence others in an adverse way. As in Davison (1983), in this paper opposition to acquiring information exists because individuals are afraid that information will induce others to support a different decision. Hence, this paper can be seen as determining conditions for an outcome that is conceptually similar to the third-person effect - although this paper does it in a standard Bayesian setting and does not require a behavioral assumption that people expect others to perceive public information differently from the way they do it themselves.

The rest of the paper is structured as follows. I start by analysing the problem from a positive point of view. Section 2 outlines the model, in which a group of agents decides on a proposal that can be of two types, with each type bringing each agent a specific private payoff. I describe the distributions of the group members’ preferences under which the group will

\footnote{The existence of the third-person effect hypothesis has been confirmed by numerous studies, as Perloff (1999) describes.}
or will not choose to acquire a binary signal about the type.

Then next sections switch to a normative focus. Section 3 considers the effect of imposing a rule that mandates information to be revealed regardless of the collective decision. Section 4 analyses the welfare-maximising voting procedure. Finally, Section 5 concludes. All proofs are in the appendix.

2 Baseline Model

Consider a committee $I$ that needs to vote on whether to approve or reject a proposal. The payoff of each member from approving or rejecting the proposal depends on the state of the world $\omega \in \{X, Y\}$; the two states are initially considered to be equally likely. The distribution of individual payoffs is common knowledge. Before voting on the proposal, the committee can vote to acquire a public signal $\alpha$ with realisations 0 and 1. Let $\Pr(\alpha = 1 \mid \omega = X) = p$ and $\Pr(\alpha = 1 \mid \omega = Y) = q$, and assume without loss of generality that $p > q$ - thus, posterior probability that the state is $X$ conditional on receiving signal 1 is greater than 0.5; and posterior probability that the state is $X$ conditional on receiving signal 0 is smaller than 0.5.

If the proposal is approved, each individual $i \in I$ receives a payoff (von Neumann-Morgenstern utility) of $x_i$ in state $X$ and a payoff of $y_i$ in state $Y$. These payoffs can be positive or negative. Let $x \equiv (x_1, x_2, ...)$ and $y \equiv (y_1, y_2, ...)$ denote vectors of individual payoffs. If the proposal is not approved, each member receives zero payoff$^6$.

Denote by 1 a “positive” collective decision (to acquire the signal, or to approve the project). The decision is positive if the share of members who vote in favour of it is at least $\gamma \in [0, 1]$. I will assume that each individual votes as if she were pivotal - i.e. that when two alternatives give the individual different payoffs, she will vote for the alternative that gives the

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$^6$This is a normalisation. We can think of $x_i$ and $y_i$ as the difference in utilities of agent $i$ from adopting and rejecting the proposal in each state.
highest expected payoff. This corresponds to eliminating weakly dominated strategies.

Let \( g : \mathbb{R}^I \rightarrow \{0, 1\} \) be a social choice function that produces a decision (positive or negative) given a vector of payoff differences between the positive and a negative alternative. Thus, for example, if \( g(x) = 1 \), then the proposal is adopted when the state is known to be \( X \). If \( \gamma = \frac{1}{2} \), function \( g(\cdot) \) is simply a function that indicates whether the median of a vector of payoffs is positive. For other values of \( \gamma \), \( g(\cdot) \) indicates whether the corresponding quantile of the vector of payoffs is positive. Note that \( g(\lambda) = g(d\lambda) \) for any \( d > 0 \) and any payoff vector \( \lambda \in \mathbb{R}^I \).

If the committee decides to acquire the signal before voting on the proposal itself, all individuals learn the realisation of the signal at no cost. We can consider two different settings. In the first setting the group can commit to reject the proposal “in ignorance”, without acquiring information. In this case, the committee faces two choices: The committee thus faces two choice. First, they decide whether to acquire the signal. Then, given the available information, they choose whether to go ahead with the project. This corresponds most closely to situations in which acquiring information involves measures such as commissioning a study, consulting an expert, organising public debate, and so on. This setting will be examined in Section 2.1.

In the second case, the group cannot commit to reject the proposal in ignorance. Such a setting is equivalent to a two-period model in which the group can choose to adopt the proposal in ignorance in period 1. If the committee does not initially adopt the proposal, it waits until the next period, in which signal \( \alpha \) arrives, and members update their (common) belief about the state. Then they can vote again and will either adopt the proposal or reject it permanently. This setting will be analysed in Section 2.2.
2.1 The Case with Commitment

2.1.1 Preference for Ignorance

If the committee chooses to acquire information, then, upon receiving signal 1, they will believe that the state is $X$ with probability $\frac{p}{p+q}$. In this case, voter $i$'s expected payoff if the project is approved is $\frac{p}{p+q}x_i + \frac{q}{p+q}y_i$. Thus, when signal 1 is received, the project will be approved if and only if $g \left( \frac{p}{p+q}x_i + \frac{q}{p+q}y_i \right) = 1$ - or, equivalently, if and only if $g(px + qy) = 1$.

Similarly, if signal 0 is received, the posterior probability that the state is $X$ equals $1 - \frac{p}{1-p}(1-q)$. Then voter $i$ gains $1 - \frac{p}{1-p}(1-q)x_i + \frac{1-q}{1-p}(1-q)y_i$ in expectation if the proposal goes ahead - hence, the proposal goes ahead if and only if $g \left( \frac{1-p}{1-p}(1-q)x_i + \frac{1-q}{1-p}(1-q)y_i \right) = 1$ - equivalently, if and only if $g([1-p]x + [1-q]y) = 1$.

Ex ante, the two states are equally likely. Thus, if information is not acquired, agent $i$'s expected payoff from adopting the proposal is $\frac{1}{2}x_i + \frac{1}{2}y_i$. Then in ignorance, the group adopts the proposal whenever $g(\frac{1}{2}x_i + \frac{1}{2}y_i) = 1$, i.e. whenever $g(x + y) = 1$.

Suppose that the signal is acquired. If the state is $X$, then with probability $p$, signal 1 will arrive and each agent $i$ will receive payoff $x_i$ as long as $g(px + qy) = 1$; with probability $1 - p$ signal 0 will arrive, and each agent $i$ will receive payoff $x_i$ whenever $g([1-p]x + [1-q]y) = 1$. Similarly, if the state is $Y$, then with probability $q$ signal 1 will arrive and agent $i$ will receive $y_i$ if and only if $g(px + qy) = 1$; with probability $1 - q$ signal 0 will arrive and agent $i$ will receive $y_i$ whenever $g([1-p]x + [1-q]y) = 1$. Thus, if the committee chooses to acquire information, the ex ante expected payoff of individual $i$ will be:

\[
\frac{1}{2}x_i [pg(px + qy) + (1 - p)g([1 - p]x + [1 - q]y)] + \frac{1}{2}y_i [qg(px + qy) + (1 - q)g([1 - p]x + [1 - q]y)] =
\]
thus, agent $i$’s expected payoff if information is acquired will equal

$$\frac{1}{2} (px_i + qy_i) g(px + qy) + \frac{1}{2} ([1-p] x_i + [1-q] y_i) g ([1-p] x + [1-q] y)$$

In ignorance, agent $i$ will receive an expected payoff of $\frac{1}{2}x_i + \frac{1}{2}y_i$ whenever $g(x+y) = 1$. Now denote by $v_i$ the value of information for agent $i$ - in other words, the difference in agent $i$’s ex ante expected payoffs with and without the information. Subtracting the two expected payoffs yields:

$$v_i = \frac{1}{2} (px_i + qy_i) g(px + qy) + \frac{1}{2} ([1-p] x_i + [1-q] y_i) g ([1-p] x + [1-q] y) - \frac{1}{2} (x_i + y_i) g (x + y)$$

The committee will decide to learn the state of the world if and only if $g(v) = 1$, where $v \equiv (v_1, v_2, ...)$.

To proceed, I will make the following assumption about the decision-making procedure:

**A1. Majority or supermajority voting: $\gamma \geq \frac{1}{2}$**

A1 implies that for any payoff vector $\lambda \in \mathbb{R}^I$ such that $\lambda \neq (0, 0, ...)$, we have $g(\lambda) = 1$ implies $g(-\lambda) = 0$. In words, given a vector of payoffs, if more than $\gamma$ of the payoffs are positive, then, if payoffs are multiplied by $-1$, less than $\gamma$ of the resulting vector will have positive values.

From the expression for $v_i$, we can see that in some cases, all voters will be indifferent between acquiring and not acquiring the signal. Specifically, when $g[px + (1-p) y] = g[(1-p) x + py] = g\left(\frac{x+y}{2}\right)$, the decision is the same regardless of the signal, and $v_i = 0$ for all $i$. The following analysis will thus need to distinguish between a strict and a weak preference for ignorance. The necessary and sufficient conditions for both are summarised in the following result:
Proposition 1. Under A1, the committee has a weak preference for ignorance if and only if \( g(px + qy) = g([1 - p]x + [1 - q]y) \). Furthermore, the committee has a strict preference for ignorance if and only if \( g(px + qy) = g([1 - p]x + [1 - q]y) \neq g(x + y) \).

Proof. See Appendix

In words, the committee weakly prefers making a decision without information whenever the decisions under the two realisations of the signal are the same. The committee strictly prefers not acquiring information whenever the decisions under the two realisations of the signal are the same and also different from a decision that is made in ignorance.

Intuitively, the group wants to acquire a signal when it matters, i.e. when the collective decision changes depending on its realisation. If the collective decision is the same for both realisations of the signal, two cases are possible. First, that decision can also be the same as the decision in ignorance - in this case, information has no effect, and the committee weakly prefers not to have it. Second, the decision under two realisations of the signal can be different from the ex ante decision in ignorance. In this case, information moves the collective decision away from what was optimal ex ante - thus, acquiring information will make the committee worse off.

Corrolary 1. Under a strict preference for ignorance, the preferred decision of the median voter under either realisation of the signal will never be implemented.

Proof. If \( g(px + qy) = g([1 - p]x + [1 - q]y) = 0 \) and \( g(x + y) = 1 \), then under either realisation of the signal, the median voter prefers not to adopt the proposal. But the signal will not be acquired and the committee will make the decision in ignorance, adopting the proposal. Similar analysis applies when \( g(px + qy) = g([1 - p]x + [1 - q]y) = 1 \) and \( g(x + y) = 0 \).
2.1.2 Preference Distributions

The analysis above has looked at how decisions upon receiving different realisations of the signal affect the willingness of the committee to acquire that signal. The primitives of the model, however, are not these decisions, but individual preferences. We can now examine the question of what distributions of preferences among voters give rise to a collective preference for ignorance.

Suppose that the voting rule is simple majority (i.e. $\gamma = \frac{1}{2}$), we can look at the actual distributions of individual preferences that induce a collective preference for ignorance. Recall that the preferences of any agent $i$ are described by a pair $(x_i, y_i)$ of his payoffs from accepting the proposal under the two states. The distribution of preferences over the group is then the distribution of agents over the $(x, y)$ space. Figure 1 shows the $(x, y)$ space of state-dependent payoffs.

In Figure 1, letters $W$, $L$, $I_Y$, and $I_X$ indicate the sets of agents whose preference points are in areas bounded by thick lines. Thus, $W$ represents...
the set of sure winners - they have a positive expected utility from adopting
the proposal after any signal. \( L \) represents the set of sure losers, who prefer
the proposal to be rejected after any signal. We can refer to the sets \( W \)
and \( L \) as the sets of committed voters, or partisans. \( I_X \) and \( I_Y \) are the sets
of independent voters, whose preferred decision changes depending on the
signal. \( I_X \) are independent voters that prefer the proposal to be accepted
when the signal is 1 (i.e. when the state is more likely to be \( X \)), but not
when the signal is 0. \( I_Y \) are independent voters who get a positive expected
utility from the proposal when the signal is 0, i.e. when the state is likely to
be \( Y \).

Suppose for simplicity that the mass of those for whom \( px + (1 - p)y = 0 \)
or \((1 - p)x + py = 0\) is zero, i.e. that (almost) nobody is indifferent when
either of the signals is received. For a given set \( S \), let \(#S\) denote the number
of elements of \( S \). The following result then holds:

**Proposition 2.** *Under the simple majority rule, the committee has a weak
preference for ignorance if and only if* \( |#I_X - #I_Y| < |#W - #L| \)

**Proof.** See Appendix

This is a necessary and sufficient condition on individual payoff distribu-
tion to induce a weak preference for ignorance. Appendix 1 provides a
necessary and sufficient condition for a strict preference for ignorance to ex-
ist.

Information will thus be acquired if and only if the difference between
the numbers of independents of the two types is smaller than the difference
between the number of sure winners and the number of sure losers. Hence,
ignorance will be the collective decision when the distribution of individuals is
“relatively symmetric” along the “northwest-southeast” direction (i.e. when
\( I_X \) and \( I_Y \) are similar), and “relatively asymmetric” along the “northeast-
southwest” direction (when \( W \) and \( L \) are different).
2.1.3 Discussion

One way of interpreting this result is to use the index of social fractionalisation\footnote{Described in e.g. Montalvo and Reynal-Querol (2005)}, widely used in development literature. For a society divided into different groups, the index of fractionalisation measures the probability that two randomly selected individuals belong to different groups. When the society consists of two groups, this index is higher when the sizes of the two groups are more similar. Proposition 2 then says that ignorance will be a collective decision if fractionalisation on the state-relevant dimension is larger than fractionalisation on the state-irrelevant dimension.

In fact, there is substantial research in development literature on the impact of social fractionalisation on economic growth, corruption, quality of governance, public good provision, and risk of civil war\footnote{See Mauro (1995), Easterly and Levine (1997), Collier (2001), Alesina et al. (2003), and others.}. This paper suggests an alternative mechanism through which fractionalisation can affect economic and social outcomes. Specifically, fractionalisation affects the degree to which the society prefers to be informed when making decisions. For a given decision whose outcome depends on the state off the world, a society that is fractionalised on the state-relevant dimension more than on the state-irrelevant dimension will, ceteris paribus, acquire less information about the state. Such societies are likely to ask for less expert advice, to have less public discussion, and to make more decisions in haste.

Consider again the airport example described in the introduction. Suppose that assembly members are elected from different districts in the city - some of them represent voters in the eastern part of the city and some are elected by voters from the west. Naturally, most voters do not want to end up living near an airport. Some people, though, live in other areas that will not be affected by the airport. Aside from location, individual attitudes to the proposed airport also depend on how frequently they travel. The local
assembly would then vote on the airport without learning the location if the community is fractionalised on the matter of east-west location more than it is fractionalised in terms of frequency of travel.

As a further example, consider a legislature of a country that is considering whether to ratify a free trade agreement. It is believed that the agreement can help manufacturing while hurting agriculture, or vice versa. If the legislature is split relatively equally between the manufacturing lobby and the agricultural lobby, then it is likely to adopt or reject the law in haste, without examining its consequences.

Similarly, suppose that the legislature that needs to appoint the head of central bank. It has an option to approve or reject the candidate quickly, or to spend more time to find out whether she puts a higher priority on ensuring growth or on controlling inflation. If the legislature is fractionalised on the question of whether the priority of the central bank should be growth or low inflation, and less fractionalised on the question of whether the candidate is competent or not, then the decision is likely to be made in haste, without taking time to learn about the candidate’s priorities.

2.2 The Case without Commitment

If the group cannot commit to reject the proposal decisively without acquiring information, then they face a choice between acquiring information and then making a decision in the second period, or approving the proposal in the first period. In the former case, the expected payoff of each agent $i$ is

$$\frac{1}{2} (px_i + qy_i) g (px + qy) + \frac{1}{2} ([1 - p] x_i + [1 - q] y_i) g ([1 - p] x + [1 - q] y)$$

as before. If, however, the proposal is approved in ignorance in the first period, agent $i$ receives a payoff of

$$\frac{1}{2} x_i + \frac{1}{2} y_i$$
Then, given $A_1$, the following result holds

**Proposition 1.** Under $A_1$ and without the ability to reject the proposal in the first period, the committee has a weak preference for ignorance if and only if $g(px + qy) = g((1 - p)x + (1 - q)y)$. Furthermore, the committee has a strict preference for ignorance if and only if $g(px + qy) = g((1 - p)x + (1 - q)y) = 0$ and $g(x + y) = 1$.

**Proof.** To be added soon (available upon request).

3 Dynamic Model

To be added soon (available upon request).

4 Commitment to Transparency

In the above analysis, information acquisition was solely the committee’s decision. However, it is possible for an outside party to intervene by making the information public regardless of the committee’s decision. For instance, in the case described in the Introduction, the government can disclose the future location of the proposed airport. This section looks at welfare effect of such interventions.

Let us say that the outside party makes the decision based on a welfare function $w : \mathbb{R}^l \rightarrow \mathbb{R}$ which maps expected payoffs of individuals (given the information available to the designer) to social welfare. As a normalisation, suppose $w(0,0,...) = 0$. Let $\text{sign}(a)$ be the sign (positive or negative) of a scalar $a$. To simplify notation, denote $d(z) \equiv g(z) - \frac{1}{2}$, so that a positive $d(z)$ indicates a positive social decision.
Proposition 3. Suppose that A1 holds. Then, releasing information is weakly socially preferable if \( \text{sign} \left[ d \left( \frac{x+y}{2} \right) \right] \neq \text{sign} \left[ w \left( \frac{x+y}{2} \right) \right] \), and it is weakly harmful if \( \text{sign} \left[ d \left( \frac{x+y}{2} \right) \right] = \text{sign} \left[ w \left( \frac{x+y}{2} \right) \right] \).

Intuitively, this proposition says that information release is weakly preferable whenever the decision that the committee makes in ignorance is different from the welfare-maximising decision.

Suppose that the social choice function is a simple majority rule, and that the welfare function is the sum of payoffs. Then information release is optimal when the distribution of \( x + y \) across players has a mean and a median that are of different signs. Referring to Figure 1 above, this happens when the distribution of payoffs is skewed along the Southwest-Northeast axis.

One way to interpret this result is to imagine that the group can opt for a constitutional guarantee of transparency. Such a constitutional rule is weakly welfare-improving if the mean and the median individual ex ante payoffs are likely to have different signs. This happens, for example, if the majority of agents benefit from the proposal in expectation (hence the median is positive), but there is a minority of individuals who each lose much if the proposal is accepted (making the mean negative). Hence, a constitutional guarantee of transparency can serve as a mechanism to protect a minority, and it is optimal when a minority with a large stake in the proposal is likely to exist.

5 Optimal Voting Rule

This part looks at the problem of choosing the optimal decision rule. For this purpose I simplify the set of possible preference distributions. Specifically, I assume that, if approved, a proposal produces winners and losers. Whether a particular agent is a winner or a loser depends on the type of the proposal. The committee can decide to learn the type or to make the
decision in ignorance. Aside from this last aspect, this setup is similar to the one described in the literature on economic reform (Fernandez and Rodrik, 1991), in which a reform benefits some while hurting others, but agents do not know ex ante whether they will win or lose. Accordingly, this section of the paper describes the voting rule that maximises the expected welfare, in situations when the committee can choose whether to learn the state.

Suppose that each agent’s preferences are characterised by her type, which can be $X$ or $Y$. Accepting the proposal gives an agent a payoff of $k > 0$ if the proposal’s type $\omega$ corresponds to her type, and a payoff of $-1$ if it does not (for simplicity, assume that $k \neq 1$). In other words, for an agent of type $X$, $x_i = k$ and $y_i = -1$; while for an agent of type $Y$, $x_i = -1$ and $y_i = k$. Thus, $k$ measures the magnitude of gains relative to that of losses. Before deciding on the proposal, the committee chooses whether to acquire information; in this part I assume that acquiring information means learning the state of the world precisely.

For simplicity, I assume that the set of agents $I$ is a continuum with mass 1. Let $s \in [0, 1]$ be the share of agents whose type is $X$. Nature randomly draws $s$ from some smooth cdf $F$ with pdf $f$ over the unit interval\(^9\). Let $E_f$ be the expectation taken over $f$. Assume that $f$ is strictly positive over $[0, 1]$.

As before, agents make decisions by voting, but not necessarily by simple majority voting. Specifically, the committee votes on the alternative, and the alternative (acquiring information, or adopting the proposal) is selected whenever the number of votes in favour of it is greater that some $t$. The choice of an optimal voting rule is thus reduced to choosing the optimal $t$; denote it by $t^\ast$. I assume that this choice is made by a social planner that maximises the expected sum of agents’ payoffs, denoted by $W$.

The timing of the interaction is as follows. First, a planner chooses $t$.\(^9\) Another way of thinking about this is to assume that Nature determines whether each voter wins or loses. Then $F$ is the resulting distribution of the share of winners.
Then Nature draws $s$ from cdf $F$; all agents are informed about $s$. Following this, Nature selects the state. After that, agents vote on whether to learn the state; if more than $t$ vote for it, they all learn the state of the world. Finally, the committee votes on whether to adopt the project; it is adopted if more than $t$ vote for it.

This setup applies well to situations in which the committee will have to decide on a number of different proposals in future, and a constitutional rule describing the decision-making procedure needs to be chosen. That is why it is reasonable to assume that the distribution of agents across types is unknown at the time the constitutional rule is selected (as it can vary depending the nature of each proposal) but is known when the time comes to actually make the decision. Similarly, in such cases it is realistic to assume that the decision on information acquisition and on a proposal is made using the same procedure, as there are many decisions to be made in future, and information acquisition can take a different form in each case (for example, delaying the decision, or consulting an expert).

Note that if $g(x) = g(y) = g\left(\frac{x+y}{2}\right)$, utility is the same regardless of the information acquisition decision. Hence, the planner can ignore such cases when choosing the optimal $t$.

Section 2 has already established that when $t = 0.5$, information will be acquired if and only if $g(x) \neq g(y)$. However, if payoffs are such that each voter wins in one state and loses in the other, that result can be generalised for other voting thresholds, as the following proposition states:

**Proposition 4.** If each voter gains $k$ from a proposal of one type and $-1$ from a proposal of another type, the committee will vote to acquire information iff $g(x) \neq g(y)$.

In the subsequent analysis, I will start with a benchmark case in which $s$, the share of agents of type $X$, is not known ex ante, but there is no uncertainty about the state of the world (and hence no information acquisition
Figure 2 Optimal decision rule as a function of $k$ under full information.

decision). I will then look at a setup described above, in which $s$ and the state are not known ex ante, but the committee can choose to learn the state. Finally, I will examine the setup in which, in addition, $k$ - the relative magnitude of the winners’ gain from the proposal - is unknown at a time when the constitutional rule is selected.

5.1 No Information Acquisition

Let us look at the case when the committee will always know the state, but $s$ is unknown ex ante (but known at a time when the vote is made). In this case, the following proposition describes the optimal voting rule:

**Proposition 5.1.** *If information is always available, then* $t^* = \frac{1}{1+k}$ for any $f$.

Figure 2 shows the optimal voting threshold as a function of $k$. Intuitively, if the gains of winners are small relative to losses of the others, it is socially optimal to accept the proposal only when the share of winners is large, and vice versa. Hence, the optimal voting threshold decreases in the magnitude of $k$. 

5.2 Endogenous Information Acquisition

Now let us look at the case in which the committee can vote on whether to learn the state of the world. Nature draws $s$ from pdf $F$, and, knowing it, the committee makes a vote on whether to learn the proposal’s type before voting on the proposal itself.

**Proposition 5.2.** If information acquisition is an endogenous decision, then, for any $f$,

$$
\begin{align*}
    t^* &= \frac{1}{1+k} & \text{if } k < 1 \\
    t^* &= \frac{k}{1+k} & \text{if } k > 1
\end{align*}
$$

Figure 3 shows the optimal voting threshold as a function of $k$. As we can see, the optimal voting rule is a simple majority rule when $k = 1$, i.e. when gains and losses have the same weight. Otherwise, it increases as $k$ moves away from 1.

The reason for this non-monotonicity is that, unlike in the previous case, the committee here can choose whether they want to acquire information. If $k$ is close to zero, then it is optimal to accept the proposal only if there are many winners - just as before. If $k$ is very large, it is optimal for the proposal to go ahead in a large number of cases. However, in this case the committee
will adopt the proposal in ignorance when \( k \) is above one. Thus, it is optimal to set a high voting threshold \( t \), because it will make it more likely that the committee declines to learn the proposal’s type - and for values of \( k \) above 1, this will induce a positive decision on the proposal.

Note also that the optimal decision rule is always a supermajority, except when the losers’ losses are exactly the same as the winners’ gains. It is never optimal to have a decision threshold of less than 50%. In practice, decision thresholds below 50% are indeed rarely observed, while supermajorities are fairly common.

5.3 Endogenous Information Acquisition and Random Payoffs

In the preceding analysis, the distribution of winners and losers was uncertain when the constitutional rule was selected, but the magnitude of the winners’ gain relative to that of the losers’ loss was assumed to be known. In this section I relax that assumption.

Suppose that \( k \) is drawn (simultaneously with \( s \) but independently) from some random distribution with support on \([-\infty, +\infty]\). For simplicity, I assume that this distribution has no mass points at \( k = 1 \) or at \( k = 0 \). Each agent is informed about the realisation of \( k \) and \( s \) prior to voting, but the planner does not know them when choosing \( t \).

**Proposition 5.3.** If information acquisition is an endogenous decision, and \( k \) is not known ex ante, then, for any \( f \),

\[
t^* = \min \left\{ \frac{\Pr (k > 0) + \Pr (k > 1) (E[k | k > 1] - 1)}{\Pr (k > 0) (E[k | k > 0] + 1)} , 1 \right\}
\]

If \( k \) is always positive - i.e. if there are always some agents who benefit from the proposal - then \( \Pr (k > 0) = 1 \) and \( E[k | k > 0] = E[k] \). In this
case,

\[ t^* = \min \left\{ \frac{1 + \Pr (k > 1) (E[k | k > 1] - 1)}{E[k] + 1}, 1 \right\} \]

Suppose \( k \) is always positive. If \( k \) is very likely to be large, then \( \Pr (k > 1) \approx 1 \), and \( E[k | k > 1] \approx E[k] \). Thus, \( t^* \approx \frac{E[k]}{E[k] + 1} \). On the other hand, if \( \Pr (k > 1) = 0 \), then \( t^* = \frac{1}{E[k] + 1} \). Finally, if the median \( k \) is 1, and \( k \) is very likely to be close to 1. Then \( \Pr (k > 1) = \frac{1}{2} \), and \( E[k | k > 1] \approx E[k] \). Hence, \( t^* \approx \frac{1 + \frac{1}{2}(E[k] - 1)}{E[k] + 1} = \frac{1}{2} \), so simple majority rule is optimal. Hence, Proposition 5.3 generalises the previous results for the case when \( k \) is non-stochastic.

Now suppose that \( \Pr (k > 1) \) is almost zero. If \( E[k | k > 1] \) is relatively small, then \( t^* \approx \frac{1}{E[k] + 1} \), so the optimal decision rule is (almost) the same as in the case when the winners’ gains \( k \) are less than the losers’ losses. If, on the other hand, \( E[k | k > 1] \) is large - as in a case when the winners’ gains are likely to be small, but with a tiny probability they can be huge - then the optimal voting rule is different. Thus, a small possibility of very large gains has a disproportionate effect on the optimal decision rule.

Finally, suppose that \( k \in [0, 2] \) with probability one, and that it is symmetrically distributed around 1. Then \( E[k] = 1 \) and \( \Pr (k > 1) = \frac{1}{2} \). What happens when the variance of \( k \) increases, making the distribution “thicker” while keeping it symmetric? In such a case, \( E[k] \) and \( \Pr (k > 1) \) remain the same, but \( E[k | k > 1] \) increases. Thus, optimal \( t \) becomes larger. In other words, greater ex ante uncertainty about payoffs makes the optimal decision rule more conservative.

The latter result is fairly counterintuitive since the social welfare is affected neither by risk nor by inequality considerations. Thus, if the expected gains stay the same, greater uncertainty should not by itself call for a more conservative decision rule. The reason why it does is that, when information is not acquired, the proposal is approved whenever \( k > 1 \). The wider the cdf of \( k \), the greater its expected value conditional on it being above the
median, and the larger the total expected sum of payoffs when the proposal is adopted in ignorance. Therefore, the social value of ignorance increases.

6 Conclusions

The aim of this paper was to analyse a committee’s choice between acquiring information - a signal about the state of the world - and remaining uninformed, prior to voting on a proposal. Information is costless, and, when acquired, becomes known to all committee members. Because information can change the eventual collective decision, some committee members may be against acquiring information, and under some conditions, the share of these members may be enough for the committee to choose ignorance.

It turned out that this choice depends on the group’s decision under different signals. When different signals lead to identical decisions, the committee weakly prefers to stay uninformed. When these decisions are, additionally, different from the decision made without information, the preference for ignorance becomes strict.

Specific types of payoff distributions induce a collective preference for ignorance. It was found that the decision on the information acquisition depends on the committee members’ attitudes towards the proposal under different signals. The committee will choose to remain uninformed if and only if the number of members who support the proposal and who oppose it, regardless of information, are similar; while the number of those who support it under one signal and oppose it under the other is much greater than the number of agents with the opposite preferences. This suggests that ignorance is a collective decision in groups where fractionalisation is larger on the dimension relevant to the state than on the dimension that is irrelevant to the state.

In a dynamic setting, agents whose preferred state is revealed slower are better off. Hence, when the decision is made by a group consisting of agents
with opposing preferences, there is a benefit of learning slower.

A further result is that in a dynamic setting, making a decision rule less conservative has non-trivial consequences. Consider a case in which for either state, the proposal is never adopted when the state is known with certainty. If the minimum number of agents required to stop waiting and adopt the proposal is reduced, this at first expands the range of beliefs at which the group decides to stop and accept the proposal. At some point, however, the decision threshold becomes so low that in one of the states the proposal is adopted. In that case, the group switches to gathering the maximum amount of information.

Turning to normative aspects of the problem, this work looked at the effect of releasing information regardless of the committee’s decision. Such a release is optimal when the decision made in ignorance is different from a welfare-maximising decision - which, in the case of majority voting, happens when the distribution of average payoffs across states is skewed.

The optimal voting rule depends on the magnitude of gains relative to losses - but not on the distribution of the share of winners and losers. The welfare-maximising voting rule is a simple majority rule when each agent gains the same in the state in which he wins as the amount he loses in the unfavourable state. As the ratio of gains to losses moves away from one in either direction, the optimal rule calls for a larger plurality of votes to make a positive decision. When payoffs are random, greater uncertainty should, ceteris paribus, make the optimal supermajority larger.

The result that groups which are fractionalised on their attitude to consequences of a decision are less likely to choose to learn these consequences implies several testable predictions. For example, we can expect to see less public discussion and less demand for expert advice in societies in which there is less consensus over desirable effects of policies. Similarly, support for transparency and freedom of information can be lower in countries with more fractionalised electorates. Subsequent research can thus focus on test-
ing these predictions empirically.

References


Appendix 1: Strict Preference for Ignorance

Proposition 2 has looked at the distributions of individual state-dependent payoffs under which the committee has a weak preference for ignorance. We have earlier established (see Proposition 1b) that strict preference for ignorance is also possible. Here we will look at individual payoff distributions that give rise to such preferences.

Consider the following partition of the \((x, y)\) space of individual payoffs, with each letter \(E - J\) denoting the mass of voters located between the thick lines:

\textbf{Proposition 6.} Under \(A1\) and \(A2b\), the committee will prefer ignorance iff either (i) \(E + \max (F + G, I + J) > \frac{1}{2}\) and \(E + F + J < \frac{1}{2}\), or (ii) \(E + \min (F + G, I + J) < \frac{1}{2}\) and \(E + F + J < \frac{1}{2}\).
**Proof.** Case (i) is equivalent to the condition \( E + F + G > \frac{1}{2}, E + I + J > \frac{1}{2}, \) and \( E + F + J < \frac{1}{2} \) - hence, \( g[px + (1 - p)y] = g[(1 - p)x + py] = 1 \) and \( g\left(\frac{x+y}{2}\right) = 0 \). Case (ii) is equivalent to the condition \( E + F + G < \frac{1}{2}, E + I + J < \frac{1}{2}, \) and \( E + F + J > \frac{1}{2} \) - hence, \( g[px + (1 - p)y] = g[(1 - p)x + py] = 0 \) and \( g\left(\frac{x+y}{2}\right) = 1 \). By Proposition 1b, the committee strictly prefers ignorance iff either of these cases holds.

**Appendix 2: Generic Information Structure**

The model in Section 2 has looked at a case in which there are two payoff-relevant states of the world, and the information that can be acquired is a noisy signal about the state. A more general approach to the information acquisition problem would be to see the state of the world as an element of a generic set. The information acquisition decision can then be represented by a mapping from the set of states to some set of messages. This information structure can be described as a partition of the set of states, in which states that are mapped to the same message belong to the same element of the partition.
Suppose that there is a finite set of states $\Omega$. Each state $j \in \Omega$ occurs with a prior probability $p^j$, which is common knowledge. If the project is approved, then in state $j$ each agent $i \in I$ receives payoff $x^j_i$ - throughout this section, subscripts will denote agents, while superscripts will denote states. Let $x^j$ be a vector representing the payoffs of all agents if the proposal is approved and the state is $j$. The committee first chooses whether to acquire information structure $P$, which is a partition of $\Omega$. Let us denote by $S$ a generic element of $P$; I will refer to $S$ as a message.

If the information is not acquired, the committee bases its decision on the prior. Hence, it will approve the project if and only if $g \left[ \sum_{j \in \Omega} p^j x^j \right] = 1$. Then ex ante, if the committee chooses to stay ignorant, agents will receive the expected payoff vector $\sum_{j \in \Omega} p^j x^j g \left[ \sum_{j \in \Omega} p^j x^j \right]$.

Now suppose that the information structure $P$ is acquired. If the committee receives a message $S \in P$, the posterior probability that the state is $j$ will, by Bayes law, be $\frac{p^j}{\Pr(S)}$, where $\Pr(S)$ denotes the prior probability of receiving the message $S$. Then, upon receiving the message $S$, the committee will vote in favour of the proposal iff $g \left[ \sum_{j \in S} \frac{p^j x^j}{\Pr(S)} \right] = 1$. The ex ante expected payoff vector to all agents will then equal

$$\sum_{S \in P} \left( \Pr(S) g \left[ \sum_{j \in S} \frac{p^j x^j}{\Pr(S)} \right] \sum_{j \in S} p^j x^j \right) = \sum_{S \in P} \left( g \left[ \sum_{j \in S} p^j x^j \right] \sum_{j \in S} p^j x^j \right)$$

To avoid the awkward case in which every agent is indifferent between acquiring and not acquiring information, I will make the following assumption:
A3. Non-triviality of information. There exists an $S \in P$ such that $g \left[ \sum_{j \in S} p^{j} x^{j} \left/ Pr(S) \right. \right] \neq g \left[ \sum_{j \in \Omega} p^{j} x^{j} \right]$. This says that there is at least one message that induces a decision different from the one that is made without information. In other words, information can at least potentially have some effect.

Then the following result can be derived:

**Proposition 7.** Assume that A1 and A3 hold. Then the information partition $P$ will be acquired iff $g \left[ \sum_{j \in M} p^{j} x^{j} \right] \neq g \left[ \sum_{j \in \Omega} p^{j} x^{j} \right]$, where $M$ is the union of all $S \in P$ for which $g \left[ \sum_{j \in S} p^{j} x^{j} \right] \neq g \left[ \sum_{j \in \Omega} p^{j} x^{j} \right]$.

**Proof.** The value of information to agent $i$ - the difference in her utilities from acquiring information structure $P$ and from remaining ignorant - equals:

$$v_{i} = \sum_{S \in P} \left( g \left[ \sum_{j \in S} \frac{p^{j} x^{j}}{Pr(S)} \right] \sum_{j \in S} p^{j} x^{j} \right) - \sum_{j \in \Omega} p^{j} x^{j} g \left[ \sum_{j \in \Omega} p^{j} x^{j} \right]$$

Or:

$$v_{i} = \sum_{S \in P} \sum_{j \in S} \left[ p^{j} x^{j} g \left( \sum_{j \in S} p^{j} x^{j} \right) - g \left[ \sum_{j \in \Omega} p^{j} x^{j} \right] \right]$$

If $g \left[ \sum_{j \in \Omega} p^{j} x^{j} \right] = 0$, then the expression in the brackets equals 0 for all $S \notin M$ and equals $p^{j} x^{j}$ for all $S \in M$. Hence, $g(v) = 1$ iff $g \left[ \sum_{j \in M} p^{j} x^{j} \right] = 1$. Similarly, if $g \left[ \sum_{j \in \Omega} p^{j} x^{j} \right] = 1$, then the expression in the brackets equals 0 for all
$S \notin M$ and equals $-p^j x^j$ for all $S \in M$. Hence, $g(v) = 1$ iff $g\left[\sum_{j \in M} p^j x^j\right] = 1$, i.e. iff $g\left[\sum_{j \in M} p^j x^j\right] = 0$. Thus, $g(v) = 1$ iff $g\left[\sum_{j \in M} p^j x^j\right] \neq g\left[\sum_{j \in \Omega} p^j x^j\right]$.

Proposition 6 says the following. Take all the messages in the information structure $P$ that induce a decision different from the one made without information. Now suppose that the committee only knows that one of such messages will be received, without knowing which one. If, given this knowledge, the committee still makes the same decision (i.e. a decision different from the one they make in ignorance), then the committee will vote to acquire information structure $P$.

Appendix 3: Proofs

Proof of Proposition 1

Note that

$$v = \frac{1}{2} [px + (1-p)y] g[px + (1-p)y] + \frac{1}{2} [(1-p)x + py] g[(1-p)x + py] - \frac{x+y}{2} g\left(\frac{x+y}{2}\right)$$

1. If $g[px + qy] = g[(1-p)x + (1-q)y] = g(x+y)$, then $v_i = 0$, so all agents are indifferent between acquiring and not acquiring information.

2. If $g[px + qy] = g[(1-p)x + (1-q)y] = 0$ and $g(x+y) = 1$, then $v = -\frac{x+y}{2}$. Thus, $g(v) = g\left(-\frac{x+y}{2}\right) = 0$.

3. If $g[px + qy] = g[(1-p)x + (1-q)y] = 1$ and $g(x+y) = 0$, then $v = \frac{1}{2} [px + qy] + \frac{1}{2} [(1-p)x + (1-q)y] = \frac{x+y}{2}$, so $g(v) = g\left(\frac{x+y}{2}\right) = 0$.

4. If $g[px + qy] = 1$ and $g[(1-p)x + (1-q)y] = g(x+y) = 0$, then $v = \frac{1}{2} [px + qy]$, so $g(v) = g(px + qy) = 1$. 

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5. In a similar way, it can be shown that when \[ g[(1 - p) x + (1 - q) y] = 1 \]
and \[ g[px + qy] = g(x + y) = 0, \] \[ g(v) = 1 \]

6. If \[ g[px + qy] = 0 \] and \[ g[(1 - p) x + (1 - q) y] = g(x + y) = 1, \] then \[ v = \frac{1}{2} [(1 - p) x + (1 - q) y] - \frac{x+y}{2} = -\frac{1}{2} [px + qy], \] so \[ g(v) = g(-\frac{1}{2} [px + qy]) = 1 \]

7. In a similar way, it can be shown that \[ g(v) = 1 \] when \[ g((1 - p) x + (1 - q) y) = 0 \] and \[ g(px + qy) = g(x + y) = 1. \]

**Proof of Proposition 2**

To be added soon (available upon request).

**Proof of Proposition 3**

If \[ g[px + (1 - p) y] = g[(1 - p) x + py] = g\left(\frac{x+y}{2}\right), \] then information is irrelevant to the eventual decision, and thus to welfare. If \[ g[px + (1 - p) y] \neq g[(1 - p) x + py], \] then information is acquired anyway, so releasing it has no effect. The only case when releasing it can have an effect is when \[ g[px + (1 - p) y] = g[(1 - p) x + py] \neq g\left(\frac{x+y}{2}\right). \]

If \[ g[px + (1 - p) y] = g[(1 - p) x + py] = 1 \] and \[ g\left(\frac{x+y}{2}\right) = 0 \] (so \[ d\left(\frac{x+y}{2}\right) < 0\]), then without information being released, the expected payoff to each player is zero (the project is not adopted). If it is released, the expected payoff vector is \( \frac{x+y}{2} \), so information release is socially optimal iff \( w\left(\frac{x+y}{2}\right) > 0 \).

In the similar way we can show that when \( g[px + (1 - p) y] = g[(1 - p) x + py] = 0 \) and \( g\left(\frac{x+y}{2}\right) = 1 \) (so \( d\left(\frac{x+y}{2}\right) < 0 \)), information release is socially preferable iff \( w\left(\frac{x+y}{2}\right) < 0 \).

Putting it together, whenever \( \text{sign} \left[ d\left(\frac{x+y}{2}\right) \right] \neq \text{sign} \left[ w\left(\frac{x+y}{2}\right) \right] \), information release either has no effect, or is socially preferable. Similarly, when \( \text{sign} \left[ d\left(\frac{x+y}{2}\right) \right] = \text{sign} \left[ w\left(\frac{x+y}{2}\right) \right] \), information release is weakly harmful.
Proof of Proposition 4

Recall that we can ignore cases when \( g(x) = g(y) = g(x+y) \). Note also that \( \frac{x+y}{2} = \frac{k-1}{2} \) for all agents, and hence \( g\left(\frac{x+y}{2}\right) \) equals one when \( k > 1 \) and zero when \( k < 1 \).

Let us first prove that when \( g(x) = g(y) \), information will not be acquired. Suppose \( g(x) = g(y) = 1 \) and \( g\left(\frac{x+y}{2}\right) = 0 \); then \( g(v) = g\left(\frac{x+y}{2}\right) = 0 \). If instead \( g(x) = g(y) = 0 \) and \( g\left(\frac{x+y}{2}\right) = 1 \), then \( g(v) = g\left(-\frac{x+y}{2}\right) \). Since \( g\left(\frac{x+y}{2}\right) = 1 \) implies that \( k > 1 \), this means that \( -\frac{x+y}{2} \) is negative for all agents, and thus \( g(v) = 0 \).

Now we can prove that when \( g(x) \neq g(y) \), information is acquired. Suppose that \( g(x) = 1 \) and \( g(y) = 0 \). If \( g\left(\frac{x+y}{2}\right) = 0 \), then \( g(v) = g\left(\frac{x}{2}\right) = 1 \). If instead \( g\left(\frac{x+y}{2}\right) = 1 \), then \( g(v) = g\left(-\frac{y}{2}\right) \). Hence, agents of type \( X \) vote to acquire information, and agents of type \( Y \) vote for ignorance. Since \( g(x) = 1 \), this means that information is acquired. In a similar way, we can show that information is acquired when \( g(x) = 0 \) and \( g(y) = 1 \).

Proof of Proposition 5.1

Suppose the planner has selected some \( t \geq \frac{1}{2} \). Then, when Nature draws \( s \) from pdf \( F \), and the committee makes a vote knowing \( \omega \), the following cases can emerge:

1. \( s < 1 - t \). This happens with probability \( F(1 - t) \). In this case, \( g(y) = 1 \) and \( g(x) = 0 \). Thus, if \( \omega = X \), every agent gets zero, and if \( \omega = Y \), agents of type \( X \) receive \(-1\), and agents of type \( Y \) receive \( k \). Since there are \( s \) agents of type \( X \) and \( 1 - s \) agents of type \( Y \), the expected sum of payoffs, conditional on \( s < 1 - t \), will equal \( \frac{1}{2} E_f [-s + k (1 - s) \mid s < 1 - t] \).

2. \( s > t \). This happens with probability \( 1 - F(t) \). In this case, \( g(y) = 0 \) and \( g(x) = 1 \). Thus, if \( \omega = Y \), every agent gets zero, and if \( \omega = X \),
agents of type $X$ get $k$, and agents of type $Y$ get $-1$. The expected sum of payoffs, conditional on $s > t$, will equal $\frac{1}{2} E_f [ks - (1 - s) \mid s > t]$.

3. $s \in [1 - t, t]$. In this case the proposal of either type is rejected, and every agent receives zero.

Putting these cases together, we obtain:

$$W = F(1 - t) E_f \left[ \frac{-(k + 1)s + k}{2} \mid s < 1 - t \right] + [1 - F(t)] E_f \left[ \frac{(k + 1)s - 1}{2} \mid s > t \right] = \frac{1}{2} \left( -(k + 1) \int_0^{1-t} s dF(s) + kF(1 - t) + (k + 1) \int_t^1 s dF(s) - [1 - F(t)] \right)$$

It is easy to verify that, when the planner selects $t < \frac{1}{2}$, we get a similar expression.

Then $\frac{dW}{dt} = \frac{1}{2} [1 - t - kt] \left( f(1 - t) + f(t) \right)$. This expression is positive for $t < \frac{1}{1+k}$ and negative for $t > \frac{1}{1+k}$.

Hence, $t^* = \frac{1}{1+k}$.

**Proof of Proposition 5.2**

Suppose the planner has selected some $t \geq \frac{1}{2}$. Then, when Nature draws $s$ from pdf $F$, and the committee makes a vote knowing the it, we can have the following situations:

1. $s < 1 - t$. This happens with probability $F(1 - t)$. In this case, $g(x) = 0$ and $g(y) = 1$, hence $g(v) = 1$. Thus, if $\omega = X$, every agent gets zero, and if $\omega = Y$, agents of type $X$ receive $-1$, and agents of type $Y$ receive $k$. The expected sum of payoffs, conditional on $s < 1 - t$, will equal $\frac{1}{2} E_f [-s + k (1 - s) \mid s < 1 - t]$.

2. $s > t$. This happens with probability $1 - F(t)$. In this case, $g(x) = 1$ and $g(y) = 0$, hence $g(v) = 1$. Thus, if $\omega = X$, agents of type $X$ get $k$, and agents of type $Y$ get $-1$, and if $\omega = Y$, everyone gets zero. The expected sum of payoffs, conditional on $s > t$, will equal $\frac{1}{2} E_f [ks - (1 - s) \mid s > t]$. 

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3. $s \in [1-t, t]$. This happens with probability $F(t) - F(1-t)$. In this case, $g(x) = g(y) = 0$, so hence $g(v) = 0$. When they make the decision in ignorance, every agent's payoff is $\frac{k-1}{2}$ if $k > 1$ and 0 if $k < 1$.

Thus, the expected sum of payoffs when $k > 1$ equals

$$W = F(1-t)E_f\left[\frac{-(k+1)s+k}{2} | s < 1-t \right] + [1 - F(t)]E_f\left[\frac{(k+1)s-1}{2} | s > t \right] + [F(t) - F(1-t)] \frac{k-1}{2} = \frac{1}{2} \left[ - (k+1) \int_0^{1-t} s dF(s) + kF(1-t) \right] + \frac{1}{2} \left[ (k+1) \int_t^1 s dF(s) - [1 - F(t)] \right]$$

and when $k < 1$, it equals

$$W = F(1-t)E_f\left[\frac{-(k+1)s+k}{2} | s < 1-t \right] + [1 - F(t)]E_f\left[\frac{(k+1)s-1}{2} | s > t \right] = \frac{1}{2} \left[ - (k+1) \int_0^{1-t} s dF(s) + kF(1-t) + (k+1) \int_t^1 s dF(s) - [1 - F(t)] \right]$$

It is easy to see that expected welfare as a function of $t$ is the same when $t < \frac{1}{2}$.

For $k > 1$, the proof is the same as for Proposition 5.1, so $t^* = \frac{1}{1+k}$. For $k < 1$, note that $\frac{dw}{dt} = \frac{1}{2} [k - t - kt] [f(1-t) + f(t)]$. This expression is positive for $t < \frac{k}{1+k}$ and negative for $t > \frac{k}{1+k}$. Hence, $t^* = \frac{k}{1+k}$.

**Proof of Proposition 5.3**

If the planner has chosen $t \geq \frac{1}{2}$, then from her point of view, the expected payoffs are as follows:

1. If $s < 1-t$ and $k > 0$ - this happens with probability $F(1-t) \Pr(k > 0)$ - the information is acquired and the proposal of type $Y$ is adopted. The ex ante expected sum of payoffs in that case is $\frac{1}{2} E [-s + k(1-s) | s < 1-t, k > 0]$.
2. If \( s > t \) and \( k > 0 \) - this happens with probability \([1 - F(t)] \Pr(k > 0)\) - the information is acquired and the proposal of type \( X \) is adopted. The ex ante expected sum of payoffs is \( \frac{1}{2} E[ks - (1 - s) \mid s > t, k > 0] \).

3. If \( 1 - t < s < t \) and \( k > 1 \), the information is not acquired, and, as every voter’s payoff from the proposal is \( k + 1 \), the proposal of either type is adopted. The expected sum of payoffs is \( \frac{1}{2} E[k - 1 \mid 1 - t < s < t, k > 1] \).

4. In all other cases, the proposal will be rejected, so the payoff of all agents is zero.

Similar logic applies for the case when \( t < \frac{1}{2} \).

In this case,

\[
W = F(1 - t) \pi_0 \frac{1}{2} Ef[-s + k_0(1 - s) \mid s < 1 - t] + [1 - F(t)] \pi_0 \frac{1}{2} Ef[k_0s - (1 - s) \mid s > t] + [F(t) - F(1 - t)] \pi_1 (k_1 - 1) = \frac{1}{2} \left(-\pi_0 (k_0 + 1) \int_0^{1-t} sdF(s) + \pi_0 k_0 F(1 - t)\right) + \frac{1}{2} \left(\pi_0 (k_0 + 1) \int_t^1 sdF(s) - \pi_0 [1 - F(t)] + \pi_1 [F(t) - F(1 - t)] (k_1 - 1)\right)
\]

where \( \pi_0 \equiv \Pr(k > 0) \), \( \pi_1 \equiv \Pr(k > 1) \), \( k_0 \equiv E[k \mid k > 0] \), and \( k_1 \equiv E[k \mid k > 1] \). Then

\[
\frac{dW}{dt} = \frac{1}{2} \left[\pi_0 (1 - t - k_0 t) + \pi_1 (k_1 - 1)\right] \left[f(1 - t) + f(t)\right]
\]

and hence \( t^* = \min \left\{ \frac{\pi_0 + \pi_1 (k_1 - 1)}{\pi_0 (k_0 + 1)}, 1 \right\} \).