ONLINE APPENDIX: A MODEL OF INFORMED VOTING

We develop a simple model to understand the ways in which active voters tend to behave, compared to passive voters. We present the model in terms of a director vote, but it generalizes to compensation and governance votes. The model is one of sequential learning, in the spirit of Bikhchandani, Hirshleifer, and Welch (1992). In addition, it is also related to Kacperczyk and Seru (2007), who solve the Bayesian model with public and private signals for managers making portfolio decisions.

The basics of the model are as follows. A director can be of type "High" or "Low" (H and L for brevity). ISS observes a noisy signal about the true type and makes a voting recommendation. The mutual fund buys the ISS recommendation, receives its own noisy private signal and decides to vote "For" or "Against".[1] The proportion of H directors equals α ($\alpha>0$), meaning the average probability a director is H equals α. We assume that ISS receives the correct signal with probability β and gets a wrong signal with probability $(1-\beta)$. Analogously, the mutual fund receives the correct signal with probability θ and gets a wrong signal with probability $(1-\theta)$. For example, if the director true type is H, ISS has chance β to observe H and the mutual fund has chance θ to observe H. Thus, more precise signals are represented by higher values of β and θ. We further assume that both signals are informative but not completely revealing, i.e., $0.5<\beta<1$, and $0.5< \theta <1$.

We begin by just considering the relation between ISS's recommendation and the probability that the director is of a given type. After developing this intuition, we then incorporate the effects of the fund's private signal, as the fund's vote is based on the probability that a director is of a given type conditional on both the ISS recommendation and the fund's private signal.

ISS recommends "For" if its signal indicates that the probability a director is of type H is greater than α. Intuitively, ISS recommendations are based on the assumption that the company can always locate a director of at least 'average' quality. Mathematically, if ISS receives an H signal, the conditional probability the director is of high type becomes:

[1] Nearly every mutual fund subscribes to a proxy advisory service company. First, these companies aggregate background information on the issues up for vote across a wide array of companies; conversations with funds indicate that the costs of purchasing these data are less than the costs of conducting such data collection in-house. Second, the 2003 SEC ruling ("Final Rule: Proxy Voting by Investment Advisers", Release No. IA-2106, Jan 31st, 2003) and subsequent 2005 no-action letter ensure that funds that rely on the proxy advisory recommendations have satisfied their fiduciary duty. This institutionalization of proxy advisory recommendations is similar to the institutionalization of credit rating agencies.

$$\Pr(\text{Type=H} \mid \text{ISS=H}) = \frac{\Pr(\text{Type=H \& ISS=H})}{\Pr(\text{ISS=H})}$$

$$= \frac{\Pr(\text{ISS=H} \mid \text{Type=H}) \times \Pr(\text{Type=H})}{\Pr(\text{ISS=H} \mid \text{Type=H}) \times \Pr(\text{Type=H}) + \Pr(\text{ISS=H} \mid \text{Type=L}) \times \Pr(\text{Type=L})} \quad (1)$$

$$= \frac{\alpha\beta}{\alpha\beta+(1-\alpha)(1-\beta)} > \alpha \text{ as long as } \beta>0.5$$

Given that $\beta>0.5$ by assumption (i.e., ISS's signal is assumed to be informative), these equations indicate that whenever ISS receives an H signal, the conditional probability of the director being high type is greater than the average director quality, α. Therefore, ISS will recommend voting "For" if it receives an H signal. Similarly, ISS will recommend "Against" if it receives an L signal.

The mutual fund conducts a similar analysis to make its vote, but this decision is conditional on both the ISS signal, which is fully revealed by the ISS recommendation, and on its own private signal. For example, consider a fund's vote conditional on observing a private signal of H and an ISS signal of L. We know that a fund will vote "For" if it perceives director quality higher than α. The fund will expect director quality:

$$\Pr(\text{Type=H} \mid \text{ISS=L, Fund=H})$$

$$= \frac{\Pr(\text{ISS=L,Fund=H} \mid \text{Type=H}) \times \Pr(\text{Type=H})}{\Pr(\text{ISS=L,Fund=H} \mid \text{Type=H}) \times \Pr(\text{Type=H}) + \Pr(\text{ISS=L,Fund=H} \mid \text{Type=L}) \times \Pr(\text{Type=L})} \quad (2)$$

$$= \frac{(1-\beta)\theta\alpha}{(1-\beta)\theta\alpha+\beta(1-\theta)(1-\alpha)}$$

Mathematically, it can be shown that the above probability is above α if $\theta>\beta$, i.e., as long as the fund signal has higher precision than the ISS signal. The intuition is simple, as long as the fund has a better quality signal than ISS, it will trust its H signal more than the ISS L signal.

Because fund signals are private, we empirically only observe the fund vote and the ISS recommendation. We thus seek to analogously solve the probability of the possible [ISS recommendation, fund vote] combinations through the model. Consider first the case in which the ISS signal is L. If the fund similarly receives a signal of L, there is a zero probability it will vote "For". If the fund receives a signal of H, it will vote "For" if $\theta>\beta$. In sum, when $\theta<=\beta$ the overall probability of the fund voting "For" given an ISS signal of L equals zero. When $\theta>\beta$, the fund trusts its signal more than ISS's signal, and the probability of the fund voting "For" and ISS signal of L equals:

$$\Pr(\text{ISS=L, Fund=H})$$

$$= \Pr(\text{ISS=L,Fund=H} \mid \text{Type=H}) \times \Pr(\text{Type=H}) + \Pr(\text{ISS=L,Fund=H} \mid \text{Type=L}) \times \Pr(\text{Type=L}) \quad (3)$$

$$= (1\text{-}\beta)\theta\alpha+\beta(1\text{-}\theta)(1\text{-}\alpha)$$

$$=(\alpha\text{-}\beta)\theta+(1\text{-}\alpha)\beta$$

Putting everything together we have:

$$\Pr(\text{Fund votes For, ISS rec Against}) = [(\alpha - \beta)\theta + (1- \alpha)\beta] \text{ if } \theta>\beta, \text{ and 0 if } \theta<=\beta \quad (4)$$

These findings highlight the importance of the fund's signal relative to that of ISS. If the fund's signal indicates the director is an H type but ISS recommends "Against", it is the relative precision of the two signals that determines the fund's vote.

A similar series of equations shows the probability of a fund voting "For" when ISS recommends "For" to be:

$$\Pr(\text{Fund votes For, ISS rec For}) = [\alpha\beta\theta + (1-\alpha)(1\text{-}\beta)(1\text{-}\theta)] \text{ if } \theta>\beta, \text{ and 1 if } \theta<=\beta \quad (5)$$

We are also interested in the probabilities of the fund voting "For" conditional on ISS recommending "Against" (Eq. (6)) and on ISS recommending "For" (Eq. (7)). These are easily derived by dividing the probabilities in equations (4) and (5) by the probabilities of ISS recommending "Against" and "For", respectively:

$$\Pr(\text{Fund votes For } \mid \text{ISS rec Against}) = \frac{(\alpha - \beta)\theta + (1\text{-}\alpha)\beta}{\alpha(1\text{-}\beta)+(1\text{-}\alpha)\beta} \text{ if } \theta>\beta, 0 \text{ otherwise, and} \quad (6)$$

$$\Pr(\text{Fund votes For } \mid \text{ISS rec For}) = \frac{\alpha\beta\theta + (1-\alpha)(1\text{-}\beta)(1\text{-}\theta)}{\alpha\beta + (1\text{-}\alpha)(1\text{-}\beta)} \text{ if } \theta>\beta, 1 \text{ otherwise.} \quad (7)$$

Figure A1 plots the conditional probabilities of a fund voting "For", given parameters α=0.9 and β=0.8. The α of 0.9 corresponds generally to the high observed rate of director support, as shown by Cai et al. (2009) and Fischer et al. (2009). Panels A shows the conditional probabilities for a fund to vote For over a range of values for fund precision, θ, of [0.7, 0.9]. Panels B shows the analogous probabilities when the fund precision parameter θ is noisy. Specifically, we assume that each value of the fund precision proxy is uniformly distributed in the [θ-0.1, θ+0.1] interval. For example, if the fund precision proxy is equal to 0.7, then the true precision of the fund has an equal probability to be anywhere in the [0.6, 0.8] interval.

The figures illustrate several patterns. First, all funds are more likely to vote For a director when ISS recommends For. This is consistent with the greater probability of the director actually being high quality. Second, as fund precision increases, the reliance on ISS decreases: the probability a fund votes For (as shown on the y-axis) decreases as a function of precision in cases that ISS recommends voting For (solid line) and increases when ISS recommends Against (dashed line). Put differently, the narrowing distance between the two lines represents a decrease in higher precision funds' tendencies to follow ISS's recommendation.

The main implication from the model can be thought of as a type of information cascade, where funds with lower precision than the ISS signal ($\theta<\beta$) always vote in accordance with ISS. Defining an "actively voting fund" as a fund with higher precision than ISS and a "passive fund" as a fund with lower precision than ISS, the model predicts that actively voting funds will disagree with ISS more often than passive funds.

We have also considered an extension, where ISS signals are biased. For example, the fact that ISS provides consulting services to firms has caused some people to conjecture that ISS may be overly favorably to management in such cases. In terms of the model, this would cause ISS to issue a For recommendation in some cases in which it observed an L signal. After incorporating this bias, the model shows that funds will disregard ISS For recommendations at an earlier point: the ISS recommendation to vote For is less informative because it might be driven by a misleading recommendation. Looking at Figure A1, the inflection point of the ISS For line in Panel A will be further to the left, and the slope of the ISS For line in Panel B will be steeper. Importantly, as long as ISS does not misreport all the time, the ISS recommendation is still informative.

References

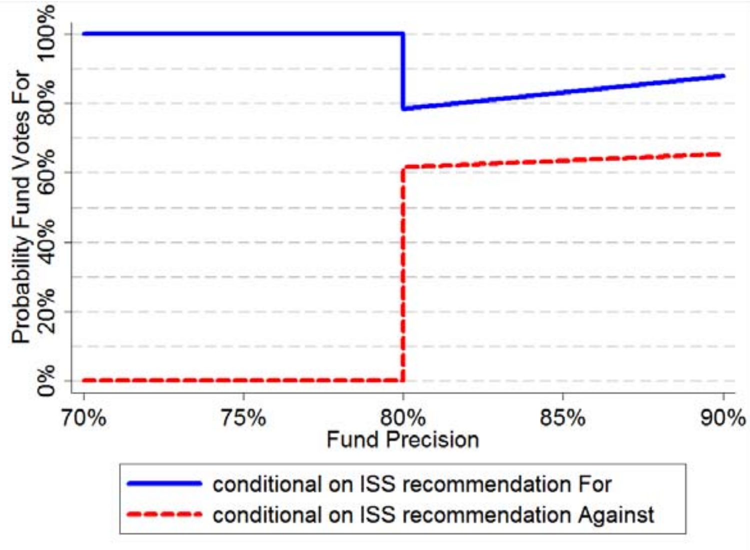
Bikhchandani, S., Hirshleifer, D., Welch, I., 1992. A theory of fads, fashion, custom, and cultural change as informational cascades. Journal of Political Economy 1992, 992 – 1026.

Kacperczyk, M., Seru, A., 2007. Fund manager use of public information: new evidence on managerial skills. Journal of Finance 62, 485 – 528.

Figure A1. Fund Conditional Probabilities to Vote For based on the Model.

This figure plots fund conditional probabilities to vote For Management, with parameters α=0.9 and β=0.8, where α is the probability of a high type and β is the probability of ISS observing a high (low) signal if the true type is high (low). Panels A plots the conditional probability for one fund over a range of fund precisions θ: [0.7,0.9]. Panels B plots the probability of observing For vote when we have a noisy proxy of the fund precision parameter θ: we assume that each value of the proxy is uniformly distributed in the [θ-0.1, θ+0.1] interval. For example, if the fund precision proxy is equal to 0.7, than the true precision of the fund has an equal probability to be anywhere in the [0.6,0.8] interval.

Panel A. Probability of Fund Vote conditional on ISS Recommendation as a Function of Fund Precision



Panel B: Probability of Fund Vote conditional on ISS Recommendation as a Function of Precision Proxy