Corruptible Advice*

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Abstract

A decision maker consults an advisor about a decision that affects another party. This third party may offer the advisor an unobservable payment to influence his recommendation. This can make advice corruptible: The third party's unobservable payment can induce the advisor to mis-report her private information to the decision maker. We study this problem in the context of an advisor who values a reputation for being incorruptible. Because of this reputational concern, the advisor may hesitate to recommend the third party's preferred action, for fear that the decision maker/buyer will see him as influenced by unobservable side-payments or "bribes". Implications are that reputational concerns may decrease information transmission, and that the third party may offer a payment to the advisor even when the third party's interests are aligned with those of the decision maker. While bad advisors who do not value their reputation would be susceptible to the bribes offered by the third-party and may mis-report a bad state of the world as good, the interesting point is that *good advisors who value their reputation might lie about the good state of the world by mis-reporting the good state as bad.* Thus bribes might not only have the function of influencing the bad advisor to lie about the bad state, but they might also be used to motivate the good advisor to correctly report the good state.

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1 Introduction

Many decisions in market settings depend upon the information received from informed advisors. We consider a problem in which a decision maker consults an informed advisor about whether to take an action that affects a third party. The advisor has some information that affects the optimal decision, and all else equal has preferences that are aligned with those of the decision maker. However, the third party may prefer a particular decision and might therefore attempt to influence the advisor's report by offering a payment that is contingent on that decision. The possibility of side payments to the advisor then influences the credibility of the advisor's report or the corruptibility of the advice provided to the decision maker. There are many examples of situations in which an outside party would like to influence the communication between an advisor and a decision maker:

- A seller encouraging a former customer to recommend an experience good to a new customer.
- Investors depending on the advice of stock analysts who work for investment banks that seek business with the firms the analyst covers.
- Film studios and recording companies might try to influence the recommendations of a film or music critic on their new releases.
- A doctor might receive support from pharmaceutical companies whose products they might recommend for patients.
- A policy maker consulting an expert about a policy that creates transfers to a firm. The policy maker may not know whether the expert is somehow being compensated by the organization, either through direct payments or through other means such as the promise of future employment.

These and many other situations share some common features: First, the third party's interests are well known: a seller would like a buyer to buy, a firm wants an analyst to offer a positive recommendation to investors of its stock, a pharmaceutical company wants the doctor to recommend its product etc. Second, for the advisors involved, reputation plays an important role. Thus we might expect reputational incentives to counter the information-corrupting influence of the third party.

Specifically, we look at a model with the following characteristics:

i) An decision maker consults an advisor about a 0-1 decision (where '1' is the preferred decision of the third party). ii) A third party stands to benefit if the decision maker takes a positive decision. iii) The third party can offer the advisor a payment that is conditional on the decision maker's action. iv) The advisor cares about his reputation for not being corruptible.[1] v) The payment to the advisor is not (perfectly) observable.

We present a cheap-talk model of advice in the tradition of Crawford and Sobel (1982). An informed advisor sends a message to a decision maker who shares the advisor's objectives to a certain degree. Typically in such models, the advisor has a bias relative to the decision maker's preferred outcome, and this bias prevents the advisor from fully revealing the information he has. In this paper, this bias arises endogenously from (the possibility of) side payments offered by the seller. The advisor will not be able to fully communicate what he knows about the seller (third-party) because the buyer (decision maker) will be concerned that the advisor's report has been corrupted by a payment from the seller.

Consider the example that the third-party is a seller of an experience good, the advisor an old buyer and the decision maker a new buyer. One might think of this as the phenomenon of a buyer's recommendation (or word-of-mouth) of products to friends and other members of their social circle who might be potential new buyers. Buyers are uncertain about the seller's product quality but it is revealed to them after consumption. Product quality is the likelihood with which the product will successfully generate value for a consumer (or alternatively match an individual consumer's taste) with higher quality products being successful with higher probability. Consumers who have already consumed the product can therefore provide valuable informational advice to new buyers who have not yet experienced the product. Suppose that the advisor's utility is a weighted average

[1] It must be noted that this is not necessarily the same as a reputation for accuracy. Corruptibility in this paper pertains to the advisor being perceived by the decision maker as being susceptible to influence of the bribes that the third-party might offer. A reputation for accuracy implies that the advisor cares about whether his message was consistent with the ex-post realization.

of the decision maker's utility and pecuniary self-interest. A "good" advisor attaches a higher weight to the decision maker's utility. In such a situation the seller might have the motivation to offer incentives or side-payments to an old buyer/advisor to recommend the product to a new buyer/decision-maker. The advisor desires not to appear "corruptible" by the seller who has an incentive to make side payments (referral fee) to influence the advisor's message. The advisor would like the buyer to believe he is the good type. This reputational motive means that the advisor will hesitate to recommend the action that the third party prefers, for fear that the decision maker will think the recommendation is motivated by a side payment. This means that the advisor's concern for reputation interferes with communication. Depending on the parameters, the case where the advisor cares about reputation can lead to more information transmission or less.

An interesting implication is that the information loss that arises from the advisor's desire to be perceived as incorruptible may motivate the seller to offer a payment even when he knows that the product is of high-quality and in the new buyer's best interest. In other words, it is not only the low-quality sellers who will attempt to offer a side-payment to the advisor as a "bribe" for lying about quality. But, even high quality sellers can offer payments in response to the reputational concerns of advisors created by the endogenous actions of the seller. Thus third-party payments / bribes might not only have the function of influencing the bad advisor to lie about low quality, but curiously they might also be used to motivate the good advisor to correctly report high quality.

Another interesting implication pertains to the motivations of the advisors: It is obvious that "bad" advisors who care only about their pecuniary self-interest would always have the incentive to mis-report low quality in order to collect the payment. However, the notable point is that even "good" advisors might actually mis-report a high quality product as one of low quality given the possibility of side payments. While bad advisors (who value reputation less) would be more susceptible to the bribes offered by the third-party and may lie and mis-report a bad state of the world as good, *good advisors who value their reputation more might lie about the good state of the world by mis-reporting the good state as bad,* in the presence of a third-party. This is because reporting the state as bad enhances the advisor's reputation.

Our analysis also shows that if the third party is uninformed about the state then the incentive to bribe the advisor is weaker and this leads to greater transmission of credible information from the advisor to the decision-maker. In contrast, if the third-party knows about the advisor's type, then offering a bribe to influence the advisor becomes more efficient, leading to less information transmission.

1.1 Related Research

In the absence of intervention by the third party the advisor's preferences are completely aligned with those of the decision maker. The offer of a contingent payment causes the objectives to differ. Our paper is related to the literature on strategic communication between an advisor and a decision maker when the advisor's preferences are inherently different from those of the decision maker. Crawford & Sobel (1982) show that full communication is impossible in this context, and that the degree of communication that can be achieved decreases as the preferences of the two parties diverge. Krishna & Morgan (2001) extend this to the case of multiple advisors and show that show that eliciting advice from multiple advisors sequentially is beneficial only when they are biased in opposite directions. Along these lines, Sarvary (2002) analyzes the value of eliciting second opinions from additional advisors. Sobel (1985) introduces reputation effects in this context. The decision maker is uncertain about the advisor's preferences, so that the advisor's past reports determine his credibility. Morris (2001) notes that this can generate perverse incentives for a "good" advisor. If a "bad" advisor is biased toward a certain message, then a good advisor may avoid sending that message even when it is accurate, to avoid damaging his credibility. A related paper is the analysis of stock recommendations by Morgan and Stocken (2003) who show how analysts with aligned incentives with the investor can communicate unfavourable and not favourable information. In our paper the advisor's "bias" is not inherent, but rather arises from the endogenous actions of the third party that is interested in the decision maker taking a preferred action.

A related strand of the literature focuses on the case where the advisor has no interest in how his advice affects decision making, but only cares about its impact on his reputation for accuracy. Scharfstein & Stein (1990) show that this can lead to herd behavior among managers or analysts. Ottaviani & Sorenson (2001) show that there is a loss of information in this setting. In contrast to this work our advisor does not care about a reputation for accuracy, but rather a reputation for "incorruptibility." While an absolutely incorruptible advisor would always report accurately, in general these two types of reputational incentives do not coincide. In particular, we will see that the advisor may send an inaccurate message in order to bolster his reputation as incorruptible.

Although a central motivation for this paper is to understand how a seller might attempt to influence word of mouth communication, the approach is very distinct from other work on word of mouth learning in that we focus on strategic information transmission among consumers. In the literature Ellison and Fudenberg (1995) or Banerjee and Fudenberg (2001), word of mouth communication refers to the ability of future actors to observe the outcomes of actions taken by previous agents.[2] In contrast, in this model communication is not automatic, and we focus on an agent's decision about what information to communicate.

Finally, this paper is also related to work in IO that studies how a third party can use his credibility to convince a buyer of the quality of an experience good. In Biglaiser (1993), middlemen invest in developing expertise that enables them to screen out low-quality products, giving buyers a reason to patronize them. Biglaiser & Friedman (1994) show how the fact that middlemen sell several different products enables them to credibly commit to carrying only high-quality goods, thus mitigating the moral hazard problem faced by individual sellers. In these papers, middlemen use their reputation with buyers to credibly promise not to recommend high-quality goods. In our model, reputation effects can cause the opposite problem: since seller quality is not observed perfectly, even the recommendation of a high-quality product can damage the reputation of the advisor.

2 A Simple Model

Consider a model consisting of three players: the decision maker, indexed by D, the advisor (A), and the third party (T). Define the payoffs of these three as U^D, U^A, and U^T

[2] See also Godes and Mayzlin (2004) for a recent empirical study of word of mouth effects on the Internet.

respectively. There are two possible states of the world, "high" and "low" ($s \in \{l, h\}$). There can be two types of advisor, "good" and "bad" ($t \in \{b, g\}$). We assume that D does not observe either s or t, whereas A observes both. The decision maker makes a yes or no decision $d \in \{0, 1\}$, where $d = 1$ is interpreted as a "yes." If the decision maker chooses $d = 1$ then he receives a payoff in a manner that will be made precise below. However, if he chooses $d = 0$ he gets a reservation value of 0.

If the decision maker goes forward and chooses $d = 1$, the decision will lead to either "success" or "failure," and the probability of success depends on the state of the world which is unobserved by D. The value of a success for the decision maker is $G > 0$, and a failure is $-L, L > 0$. The probability of success depends on the state of the world, and is given by θ_s, with $0 < \theta_l < \theta_h < 1$. Note that the state cannot be perfectly inferred by the decision maker after the action is taken because $\theta_h < 1$ and $\theta_l > 0$. Given s, the expected utility for D from choosing $d = 1$ is $\pi_s = \theta_s G - (1 - \theta_s)L$ and from $d = 0$ is the reservation value 0. The decision maker's expected utility, given s, can then be denoted by $U^D = \pi_s d$. The ex-ante probability that $s = h$ is assumed to be $\frac{1}{2}$, and this is common knowledge. If the decision maker chooses $d = 1$, then the third party's utility increases by w. The third party can choose to make a contingent payment $q \geq 0$, to the advisor, which is contingent on $d = 1$. The third party's payoffs are given by $U^T = [w - q]d$.

Nature draws the state s and reveals it to the advisor. The advisor's utility is a function of his own wealth as well as D's utility. The advisor's type determines the weight he attaches to wealth relative to D's utility. Specifically, the utility function of an advisor of type t's is given by,

$$U_t^A = [\alpha_t U^D + q]d. \tag{1}$$

The parameter α_t represents the weight that the advisor attaches to the decision maker's utility. Let $\alpha_g > \alpha_b$; that is, a bad advisor is more corruptible or less altruistic than a good advisor. The prior probability that the advisor is good is common knowledge and is given by $\lambda \in (0, 1)$. We first consider a simple one-shot game without reputational effects, where communication is only affected by α_t. In section (4) we consider a model in which the advisor is also motivated by reputational effects.

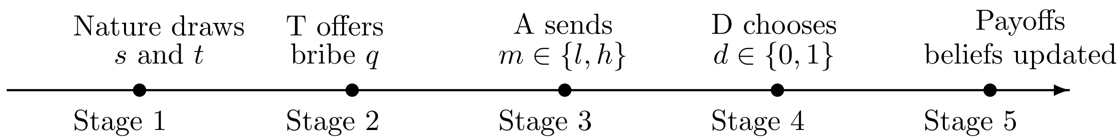

Figure 1: Timing of the model.

The timing of the game as shown in Figure 1 is as follows. Nature determines the state of the world $s \in \{l, h\}$ and advisor type $t \in \{b, g\}$. The state is revealed to the advisor and to the third party but not to the decision maker.[3] The third party may or may not observe s and also may or may not observe the advisor type t. In the analysis we will investigate the effect these alternative assumptions about T's information have on communication and the payments made by T in equilibrium. In the next stage, the third party decides the level of the contingent payment q to the advisor (which can possibly be zero). Next the advisor sends the message to the decision maker denoted by $m \in \{l, h\}$. In the fourth stage D makes the decision $d \in \{0, 1\}$. Finally, the payoffs of all the players in the game are realized and D updates beliefs about the advisor's type.

We will look for a PBE of the game described above. A PBE of this game is given by $\{q, m(s, q), \mu(m), d(\theta)\}$, where $\mu(m)$ is D's beliefs about the state conditional on m. In a PBE all players strategies are optimal given $\mu(m)$, and $\mu(m)$ is determined by Bayes rule wherever possible. Note that this is a cheap talk game, meaning that the message sent by the advisor does not directly affect the advisor's payoff (nor that of any other player). Therefore, there will always be "babbling" equilibria, in which the decision maker ignores the advisor's report, and because of this the advisor makes a report uncorrelated with his signal. We look for equilibria in which the advisor's message is *informative* and *decisive*, where informative means that the message conveys (at least some) information about the state over and above the prior, and decisive means that D's action depends on the message. The advisor's message is informative if the conditional probability that the state is h, given that the advisor's message is h, is greater than the unconditional probability of the same event. It is possible for the message to be informative but not decisive, if D's optimal

[3] In any reasonable model of advice we clearly need the advisor to have better information about s than the decision maker otherwise the advice will not have value.

action never depends on what he learns from the advisor. The approach to identifying the equilibrium will be to describe D's beliefs given the reporting strategy of A, then check whether this reporting strategy is consistent with T's strategy and with D's actions that would be induced.

3 Single Known Advisor Type

We start the analysis with the case of a single advisor type ($\alpha_t = \alpha$) and later extend to the case of multiple types of advisors and uncertainty about the advisor type for T and D. Consider first the benchmark case in which D can observe the state, then there will be no payment or "bribe" offered by T in equilibrium (from here on we will use the terms payments and bribes interchangeably). If $s = h$, then T will set $q = 0$ because the advisor's report will be $m = h$ even without any payment. If $s = l$ then T would like to influence the advice with a positive q, however, because such a payment is observable, D will infer that the state is not h irrespective of the advisor's report if she observes a positive payment being made. Therefore, if the payments are observable to the decision maker, no payments will be made in equilibrium and the presence of T will not affect communication. Therefore honest communication is always an equilibrium.

Because $0 < \theta_l < \theta_h < 1$ it is possible that there will be a failure even if $s = h$ and a success even if $s = l$. Because we are interested in communication of the advisor's information, we will focus on the case where D's optimal choice actually depends on the state. That is, we will analyze the case where $\pi_l = \theta_l G - (1 - \theta_l)L < 0 < \theta_h G - (1 - \theta_h)L = \pi_h$. Given this, D's ideal is to choose $d = 1$ if and only if $s = h$, so he will choose $d = 1$ whenever his assessed probability of the state being h is close enough to one. If $G > (\frac{1-\theta_l}{\theta_l})L$, then D should always choose $d = 1$ regardless of A's information, and if $\frac{1-\theta_h}{\theta_h}L > G$, then D should set $d = 0$ regardless of A's information. So we will focus on the case where $G \in (\frac{1-\theta_h}{\theta_h}L, \frac{1-\theta_l}{\theta_l}L)$ which is the range in which A's information will be of value to D's decision making in that D should set $d = 1$ iff $s = h$ under full information.

Definition: *If $G \in (\frac{1-\theta_h}{\theta_h}L, \frac{1-\theta_l}{\theta_l}L)$, then A's information is decisive in that D should set*

$d = 1$ *iff* $s = h$ *under full information.*

Unobservable Payments

Consider now the case in which q is not observable to D. We start with the case when the third party is informed of the state and can therefore offer a payment q_s that is conditional on the state. The analysis begins by noting that in any informative and decisive equilibrium, there are no mixed strategy equilibria.

Lemma 1 *In any informative and decisive equilibrium with one advisor type, A chooses $m(h) = h$ with probability one and $m(l) = l$ with probability one (except in the knife-edge case $-\alpha\pi_l = w$).*

Proof. Suppose $1 > x \equiv Pr(m(h) = h) > Pr(m(l) = h)$, and that $m(s)$ is decisive. Since $1 > x$, A must be indifferent between $d = 0$ and $d = 1$ when $s = h$. Thus $\alpha\pi_h + q_h = 0$. Since $q_h \geq 0$, this is impossible. Suppose $Pr(m(h) = h) > x \equiv Pr(m(l) = h) > 0$, and that $m(s)$ is decisive. Since $x > 0$, A is indifferent between $d = 0$ and $d = 1$ when $s = l$. Thus $\alpha\pi_l + q_l = 0$. T's payoff is given by $x(w - q_l)$. If $w > q_l$, then T can do strictly better by choosing $q_l + \varepsilon$, and obtaining payoff $w - q_l - \varepsilon$. If $w < q_l$, then T can do strictly better by choosing $q_l = 0$, guaranteeing a payoff ≥ 0. ■

Thus any PBE will be one in which the advisor chooses a pure message strategy upon observing the state. The PBE with honest communication is characterized in the proposition below.

Proposition 1 *When there is one third party, and when T is informed of s, there exists a PBE in which A is honest, and D believes A's report, iff $w \leq -\alpha\pi_l$.*

Proof. (Necessity) In an informative equilibrium, D believes that A is honest. Given these beliefs, A's optimal strategy $m(s, q_s)$ is given by

$$m(h, q_h) = \begin{array}{l} h \text{ if } \alpha\pi_h + q_h \geq 0 \\ l \text{ if } \alpha\pi_h + q_h < 0 \end{array}$$

$$m(l, q_l) = \begin{array}{l} h \text{ if } \alpha\pi_l + q_l \geq 0 \\ l \text{ if } \alpha\pi_l + q_l < 0 \end{array}$$

Since $q_h \geq 0$, $m(h, q_h) = h$ always. Also $m(l, q_l) = l$ iff $q_l < -\alpha\pi_l$. If $m(l) = l$, then T's payoff is 0, while if $m(l) = h$, T's payoff is $w - q_l$. Therefore, T will choose $q_l > -\alpha\pi_l$ whenever $w > -\alpha\pi_l$. Therefore, $w \leq -\alpha\pi_l$ is a necessary condition.

(Sufficiency) If $w \leq -\alpha\pi_l$, then $q_h = q_l = 0$ is an equilibrium strategy for T and is consistent with an honest, decisive message. ■

If the payment is zero and D believes A's report, then A will be honest. In the absence of the third party, the advisor's preferences will be perfectly aligned with those of the decision maker, and there is nothing to prevent the advisor from communicating his information. But this will break down if T is willing to offer a large enough bribe to change A's report. Suppose that $s = l$, then given the assumption that T knows the state of the world, it follows that if D believed A's report, then T would be willing to offer a bribe as high as w to change the advisor's report. The relevant condition for an equilibrium is that T not want to offer a bribe that the advisor would accept. The maximum bribe that T would be willing to offer is w. Therefore, an equilibrium with honest communication exists as long as w is not too large, and in particular $w \leq -\alpha\pi_l$.

So honest communication cannot be part of a PBE if $w > -\alpha\pi_l$, which also implies $G > \frac{1-\theta_l}{\theta_l}L - \frac{w}{\theta_l\alpha}$. Thus the PBE exists for low enough values of G (for example, the valuation of a seller's product if it turns out to be a good fit for the buyer). When the value of the decision is relatively high, the expected loss from making the decision for D is small when $s = l$. This implies that a smaller bribe is likely to change the advisor's report and therefore, in equilibrium, D would believe the advisor's report only when G is relatively low.

Note also that zero bribes are paid on the equilibrium path in this full communication equilibrium. However, the possibility of bribes/side payments reduces information transmission, in that it shrinks the range over which informative communication is possible. If we think of A's informativeness as the fraction of the range $(\frac{1-\theta_h}{\theta_h}L, \frac{1-\theta_l}{\theta_l}L)$ over which honest reporting is a PBE, the informativeness is decreasing in w because this increases the payment that T is willing to offer to change A's report. Also as expected the informativeness is increasing in θ_l and in α.

3.1 Uninformed Third Party

Now assume that the third party does not know the state of the world. In many cases the advisor may know more than the third party about the optimal decision. An example is when there is uncertainty about the quality of the match between a specific buyer and a seller. An advisor (expert) who knows about the characteristics of a product may be in a better position to describe how well the product suits an individual buyer's needs. A seller that does not know s still has an incentive to influence the advisor's message, as long as the advisor's message is decisive. The following proposition establishes the conditions for a honest equilibrium.

Proposition 2 *When T does not know s, there exists a PBE that is informative and decisive iff $w < -2\alpha\pi_l$.*

Proof. Suppose that D believes that A is honest. A's optimal strategy $m(s,q)$ is given by

$$m(h,q) = \begin{array}{c} h \text{ if } \alpha\pi_h + q \geq 0 \\ l \text{ if } \alpha\pi_h + q < 0 \end{array}$$

$$m(l,q) = \begin{array}{c} h \text{ if } \alpha\pi_l + q \geq 0 \\ l \text{ if } \alpha\pi_l + q < 0 \end{array}$$

Since $q \geq 0$, this becomes $m(h,q) = h; m(l,q) = l$ iff $q < -\alpha\pi_l$. T's payoff is given by

$$U^T = \begin{array}{c} \frac{1}{2}(w-q) \text{ if } q \leq -\alpha\pi_l \\ w - q \text{ if } q > -\alpha\pi_l \end{array}$$

So T's optimal strategy is

$$q = \begin{array}{c} 0 \text{ if } w < -2\alpha\pi_l \\ -\alpha\pi_l \text{ if } w > -2\alpha\pi_l \end{array}$$

■

The advisor will change a negative report to a positive one if $\alpha[\theta_l G - (1-\theta_l)L] + q_l > 0$, or $q > -\alpha\pi_l$. Honest communication will lead to the decision being made with probability $\frac{1}{2}$, implying expected payoffs of $\frac{1}{2}w$ for T. The necessary condition for this to be an equilibrium will be that T does not want to offer a payment that A would accept. Therefore the necessary condition for honesty is $w \leq -2\pi_l$. Note that this condition is weaker than the necessary condition for the case where T is informed about the state ($w \leq -\alpha\pi_l$).

Thus even when T is uninformed there is an incentive to offer payments to influence the report of the advisor. However, the incentive is weaker than in the case where T knows s because the third party does not know whether a bribe is necessary or not. If the state is in fact h, T may end up paying the advisor for the message that would have been sent even without the payment. This means that an informative equilibrium is more likely when the third party does not know the state. Thus the lack of information for the third party facilitates honest communication.

3.2 Two Third parties

Until now, we have assumed that apart from the decision maker and the advisor, the decision maker's choice affects only a single third party. In many cases, there will be more than one third party who would like to influence the decision. For example, when a buyer is deciding between multiple products, each potential seller would like to encourage the buyer to choose his or her particular product.

In this section we assume there are two third parties, $T0$ and $T1$, where $T0$ would prefer $d = 0$ and $T1$ would prefer $d = 1$. If $d = 0$, then $U^{T0} = w_0$ and $U^{T1} = 0$; if $d = 1$, then $U^{T0} = 0$; $U^{T1} = w_1$. We continue to interpret $d = 0$ as a "default" choice yielding known payoffs, whereas there is uncertainty over the payoffs resulting from $d = 1$. This for example would represent the common situation facing consumers in a market where a new product has been launched. A consumer would then have to choose between a known product and a new one. Similarly, patient might have to choose between a well-known course of treatment and a new experimental one.[4]

Proposition 3 *There is an informative, decisive equilibrium to the game with two third parties if and only if* $w_1 - w_0 \leq -\alpha\pi_l$*,* $w_0 - w_1 \leq \alpha\pi_H$*, and* $G \in (\frac{1-\theta_h}{\theta_h}L, \frac{1-\theta_l}{\theta_l}L)$.

Proof. Necessity: Note that $T0$ would never choose $q_0 > w_0$ if $d < 1$, and that $T1$ would never choose $q_1 > w_1$ if $d > 0$. Suppose $w_1 > w_0 - \alpha\pi_l$. Since the advisor's message is informative and decisive, we have $m(l) = l$ and $d(l) = 0$. But $T1$ could choose $q_1 = w_0 - \alpha\pi_l + \varepsilon$, and since $w_0 \leq w_1$ this will be sufficient to change A's message. (The same argument establishes the necessity of $w_0 - w_1 \leq \alpha\pi_H$).

[4]Note that the distinction between T0 and T1 is not important. What really matters is that $U^D(1) - U^D(0)$ is a random variable. It might not be relevant whether $U^D(1)$ depends on the state or $U^D(0)$ depends on the state.

Sufficiency: The strategy profile $q_{0h} = 0, q_{0l} = w1, q_{1h} = w0, q_{01} = 0$,

$$m(h, q_{0h}, q_{1h}) \quad = \quad \begin{array}{c} h \text{ if } \alpha\pi_h + q_{1h} \geq q_{0h} \\ l \text{ if } \alpha\pi_h + q_h < q_{0h} \end{array}$$

$$m(l, q_{0l}, q_{1l}) \quad = \quad \begin{array}{c} h \text{ if } \alpha\pi_l + q_{1l} \geq q_{0l} \\ l \text{ if } \alpha\pi_l + q_{1l} < q_{0l} \end{array}$$

supports an informative, decisive PBE of the game under the assumptions of the proposition. ■

The proposition shows that for an informative equilibrium to exist the payoffs to the third-parties cannot be too different. This in turn implies that if $w_0 > \alpha\pi_h$ or $w_1 > -\alpha\pi_l$, and $w_0 - w_1 \leq \min\{\alpha\pi_h, -\alpha\pi_l\}$, then an informative equilibrium must involve positive bribes.

Proposition 4 *With two T's, there is an equilibrium in which the advisor's message is informative and decisive, and in which $q_0 = q_1 = 0$, only if $w_0 \leq \alpha\pi_h$ and $w_1 < -\alpha\pi_l$.*

Proof. (sketch) Suppose that $q_0 = q_1 = 0$, and that $w_0 > \alpha\pi_h$. If the advisor's message is informative and decisive, then when $s = h, m = h$ and $d = 1$. Since $w_0 > \alpha\pi_h$, there is some $q_0 \in (\alpha\pi_h, w_0)$ that will induce A to choose $m(h) = l$ and will yield a higher payoff for $T0$. ■

This means that as long as w_0 and w_1 are relatively large and not too different, there will be positive bribes in an informative, decisive equilibrium. This implies that competition between sellers to elicit a favorable recommendation from an advisor might lead to positive payments being offered even in an informative equilibrium.

3.3 Advisor Type Uncertainty

We now consider the case of two possible types of advisors denoted by $t \in \{b, g\}$. Let the type of the advisor be uncertain for the decision maker and the third party. Specifically, both T and D only know the prior probability λ that the advisor is good. This allows us to examine two important aspects of the advice problem of this paper: First, it enables us to consider the effect of uncertainty that the decision maker and the third party have about the advisor types. In addition, uncertainty about advisor types is necessary to examine the role of advisor reputation on communication which we study in the next section.

As in the case of a single type of advisor, there is a full communication PBE which involves both types of advisors being honest. If $q = 0$ and D believes A's report, then A will be honest. But this breaks down if T is willing to offer a large enough bribe to change A's report. Suppose that $s = l$, then if A were to be honest and D believed this, T would be willing to offer a bribe as high as w to change the advisor's report. The advisor will change a negative report to a positive one if $\alpha_t \pi_l + q > 0$, or if $q > -\alpha_t \pi_l$.

The third party could either offer a bribe that convinces a bad advisor to change his report, or a larger bribe that convinces a good advisor to change his report. For honest communication to be an equilibrium, neither must be appealing, so the relevant condition is that T not want to offer a bribe that the bad advisor would accept. Because the maximum bribe that the seller would be willing to offer is w, honest communication (under uncertainty about advisor type) cannot be part of a PBE if $w > -\alpha_b \pi_l$ or alternatively $G > \frac{1-\theta_l}{\theta_l} L - \frac{w}{\theta_l \alpha_b}$. Therefore, a PBE in which both types of A are honest, and D believes A's report, exists if and only if $G \leq \frac{1-\theta_l}{\theta_l} L - \frac{w}{\theta_l \alpha_b}$.

It is interesting to note that this condition is independent of λ the prior probability that the advisor is good. If T offers a payment that only a bad advisor would accept, it is only paid if the advisor is indeed bad. It is also interesting to note that as in the case of a single advisor type, no bribes are actually paid on the equilibrium path in this full communication equilibrium. However, the possibility of bribes/side payments decreases information transmission, in that it shrinks the range over which informative communication is possible. Also as before the informativeness (the fraction of the range $(\frac{1-\theta_h}{\theta_h} L, \frac{1-\theta_l}{\theta_l} L)$ over which honest reporting is an equilibrium) is decreasing in w because this increases the payment that T is willing to offer to change A's report.

Partially Informative Equilibrium

Unlike in the single advisor case, with two types of advisors there is also a partially informative equilibrium in which one type of advisor mis-reports the state. In such an equilibrium the bad advisor always accepts the payment and recommends purchase, and the good advisor is honest.[5] In such an equilibrium we have,

$$\Pr[s=h|m=h]=\frac{\frac{1}{2}}{\frac{1}{2}\lambda+(1-\lambda)}=\frac{1}{2-\lambda}.$$

The expected payoff to D of setting $d=1$, given $m=h$, is $\frac{1}{2-\lambda}(\theta_h G-L(1-\theta_h))+\frac{1-\lambda}{2-\lambda}(\theta_l G-L(1-\theta_l))$, so D will act on a positive recommendation if this payoff is positive, or if

$$G>\frac{1-\theta_h+(1-\lambda)(1-\theta_l)}{\theta_h+(1-\lambda)\theta_l}L$$

If $m=l$ then D knows that the advisor is honest, so the strategy after a negative report is still to set $d=0$ iff $G<(\frac{1-\theta_l}{\theta_l})L$. So the report is decisive for $G\in(\frac{1-\theta_h+(1-\lambda)(1-\theta_l)}{\theta_h+(1-\lambda)\theta_l}L,\frac{1-\theta_l}{\theta_l}L)$. In a PBE, it must be that T is willing to offer a bribe large enough to convince a type b advisor to lie, but not large enough to convince a type g advisor to lie. The following proposition characterizes this equilibrium,

Proposition 5 *There exists a PBE in which only good advisors are honest iff,*

$$G\in(\max\{\frac{1-\theta_h+(1-\lambda)(1-\theta_l)}{\theta_h+(1-\lambda)\theta_l}L,\frac{1-\theta_l}{\theta_l}L-\frac{w}{\theta_l\alpha_b}\},\frac{1-\theta_l}{\theta_l}L-\frac{\lambda w}{\theta_l[\alpha_g-(1-\lambda)\alpha_b]}).$$

In equilibrium, positive payments are made by T to the advisor.[6]

Proof. It is optimal for T to offer a bribe that convinces the type b advisor to change his report if $\alpha_b[\theta_l G-(1-\theta_l)L]+w>0$, or $G>\frac{1-\theta_l}{\theta_l}L-\frac{w}{\theta_l\alpha_b}$. Next, T's payoff from offering a bribe that changes the report of only the bad advisor should be higher than offering a bribe that changes the report of both types. Because T does not know A's type, then the bribe T is willing to offer depends on A's expected report. To bribe the good advisor is worse for T than no bribe at all if $\alpha_g[\theta_l G-(1-\theta_l)L]+w<0$, or $G<\frac{1-\theta_l}{\theta_l}L-\frac{w}{\theta_l\alpha_g}$. But it is possible that bribing the good advisor is profitable, but less profitable than bribing the bad advisor only. The bribe that is necessary to

[5] If either type always reported l and the message was decisive, then that advisor could strictly improve his payoffs by switching to $m(h)=h$. If the bad advisor were honest and the good advisor always reported h, then we must have $\alpha_g[\theta_l G-(1-\theta_l)L]+q_l>0$ and $\alpha_b[\theta_l G-(1-\theta_l)L]+q_l<0$, a contradiction given $\alpha_g>\alpha_b$.

[6] As in the single advisor model, there are no equilibria in mixed strategies. If one type is mixing between $m_t(l)=l$ and $m_t(l)=h$, then we must have $\alpha_t[\theta_l G-(1-\theta_l)L]+q_l=0$. T could increase q_l slightly and obtain a discrete increase in the probability of $d=1$, improving his payoff except in the knife-edge case $\alpha_t[(1-\theta_l)L-\theta_l G]=w$. However, in the model with reputation effects mixed strategy equilibria are possible.

convince type t is $\alpha_t[(1-\theta_l)L-\theta_l G]$, so the condition to ensure that only bribing the bad advisor is profitable for T is $(1-\lambda)[w-\alpha_b((1-\theta_l)L-\theta_l G)] > w-\alpha_g((1-\theta_l)L-\theta_l G)$ which reduces to,

$$G < \frac{1-\theta_l}{\theta_l}L - \frac{\lambda w}{\theta_l[\alpha_g-(1-\lambda)\alpha_b]} \tag{2}$$

Next note that $\frac{1-\theta_l}{\theta_l}L - \frac{w}{\theta_l\alpha_g} < \frac{1-\theta_l}{\theta_l}L - \frac{\lambda w}{\theta_l[\alpha_g-(1-\lambda)\alpha_b]}$, because $\alpha_g > \lambda\alpha_g + (1-\lambda)\alpha_b$ and this leads to the proposition. ■

The main of the proposition is that in this partially informative equilibrium, positive bribes are paid by the third party. These payments offered in the range where only good advisors are honest. If both types are honest or if no message is believed, then there is no reason to pay bribes. Given that the advisor types are unobservable to T, the bribes while collected by either types are only successful in changing the reporting strategy of the bad advisor. The equilibrium size of the bribe will be $\alpha_b[(1-\theta_l)L-\theta_l G)]$ and it decreases if θ_l the probability with which there is a success in the low state (for example, the quality offered by a low quality seller) increases. An increase in (θ_l) decreases the loss in utility due to altruism concerns for the bad advisor in the event of a change in the report.

Consider the example of sellers offering referral fees to elicit product recommendation. In general, the referral fees offered by good and bad sellers are different. If this were observable to the buyer, then the fee would act as a signal of seller quality. If payments are observable, then there is always an equilibrium where no payments are offered and the advisor is honest. However, if payments are only partially observable (only observed with some probability less than one), and if the probability is small enough then we would expect the informative equilibrium to be analogous to that in the proposition above and to involve positive referral payments.

4 Advisor Reputational Effects

When the decision maker and advisor interact repeatedly, the advisor must consider the reputational impact of current advice. Now the weight that D attaches to the advisor's message depends on his beliefs as to whether the advisor is good or bad, which depends in turn on past advice and outcomes. The advisor's payoffs are affected by his reputation in that a higher reputation gives him a greater chance to sway the buyer, and a greater reputation could lead to a higher bribe being offered.

Consider that the advisor and the decision maker interact for two periods. Assume that the advisor's second period payoffs are a strictly increasing function of his updated reputation $\hat{\lambda}$ at the end of the first period. It is important to note that this would not necessarily be the result of a twice-repeated version of the game in section 3 above. For a given G, the decision maker follows the advisor's recommendation if and only if $\hat{\lambda}$ is above a threshold value. But if there is some uncertainty about the value of the future opportunity, a higher reputation will lead to a higher expected utility for the advisor. The advisor's payoff, including reputation effects, is given by,

$$W_t = \alpha_t U^G + qd + V_t(\hat{\lambda}) \tag{3}$$

where $\hat{\lambda}$ is the advisor's reputation at the end of the first period and $V_t(\hat{\lambda})$ is the value of $\hat{\lambda}$ for the advisor of type t.[7] The analysis strategy is to look at how this affects the range of G for which there is an informative equilibrium. As before there are two possible types of fully informative equilibria (both types of advisors are honest) and partially informative (only the good advisor is honest).

In a fully informative equilibrium reputation effects do not change the range over which both types of advisors are honest compared to the no reputation case. If both types of advisors are honest, then in equilibrium reputation effects will be absent. Since with honest reporting both types behave identically, the buyer can infer nothing about an advisor's type from his behavior. Without reputation effects payoffs are the same as in the one-shot game, so the necessary conditions for honesty are the same. Thus even with reputation effects, there exists a PBE in which both types of A are honest, and D believes A's report, iff $G < \frac{1-\theta_l}{\theta_l}L - \frac{w}{\theta_l \alpha_b}$. Suppose that both types are honest in the first period,

[7]We can also look at repeated interaction between the advisor and the decision maker and this is an argument for why the advisor might value a better reputation. In such a model beliefs about λ affect both whether the decision maker takes advice and the bribe offered by the third party, and both things affect the advisor's payoffs directly. Suppose that G is a random variable with distribution function $\Gamma(G)$. The advisor's expected utility from a single period is given by $\frac{1}{2}\int(U_t^A|\lambda, s=h)d\Gamma(G) + \frac{1}{2}\int(U_t^A|\lambda, s=l)d\Gamma(G)$. We can now define $V_t(\hat{\lambda})$ as the value of reputation to an advisor of type t, and show that it is an increasing function to recover the qualitative insights which are similar to that in this section.

and that the threshold is higher than the one with no reputation effects. This means beliefs about A's type are the same in period 2 as in period 1. Therefore lying would have no reputational consequences. But this means that a bad advisor would have accepted a bribe that would have worked in changing the report in the case without reputation effects. Thus the threshold is the same as in the case without reputation effects.

Reputational Updating

Consider now the equilibrium in which only the good advisor is honest. In this case, the advisor's report does indeed affect his reputation, since a bad advisor sets $m = h$ more often than a good advisor. We start by describing how the advisor's reputation depends on his report. If the bad advisor always chooses $m = h$, then a report that the state is low implies for sure that the advisor is good; that is, $\hat{\lambda}(l, 0) = 1$, where $\hat{\lambda}(m, x)$ is D's updated belief about the advisor's type, as a function of the advisor's report and the actual outcome. The outcome space is defined by $X \in \{S, F, 0\}$ where S is success, F failure and 0 represents "no decision" by the decision maker. If the advisor recommends $m = h$, then his reputation will depend on the decision maker's experience. If D experiences a success, then we have

$$\hat{\lambda}(h, S) = \frac{\lambda \frac{1}{2}\theta_h}{\lambda \frac{1}{2}\theta_h + (1-\lambda)[\frac{1}{2}\theta_h + \frac{1}{2}\theta_l]} = \frac{\lambda\theta_h}{\theta_h + (1-\lambda)\theta_l}$$

and if a failure,

$$\hat{\lambda}(h, F) = \frac{\lambda \frac{1}{2}(1-\theta_h)}{\lambda \frac{1}{2}(1-\theta_h) + (1-\lambda)[\frac{1}{2}(1-\theta_h) + \frac{1}{2}(1-\theta_l)]} = \frac{\lambda(1-\theta_h)}{1-\theta_h + (1-\lambda)(1-\theta_l)}$$

The point to now note is that $\hat{\lambda}(h, F) < \hat{\lambda}(h, S) < \lambda$. Naturally a recommendation of h which is followed by a failure is more harmful to the advisor's reputation than a recommendation followed by a success. *But the more interesting point is that the advisor's reputation suffers whenever $m = h$, even if the result is a success.* This feature of reputational updating can lead to the advisor choosing to lie about the high state in order to establish himself as a good type. Not only does honestly reporting $s = h$ harm the advisor's reputation relative to the prior, but in an informative equilibrium, lying about $s = h$ establishes the advisor as certainly good. This implies a strong reputational incentive to lie about state h on the part of both types of advisors. This feature of the reputational updating which causes the advisor to lie even when his incentives are aligned with that of the decision maker (i.e., to misreport the state h) is akin to the political correctness effect of Morris (2001). However, in our model this effect arises because of endogenous incentives: i.e., the presence of the third party who can offer bribe to maximize payoff. Because of this an important issue in our analysis is the characterization of these endogenous bribe offers which we proceed to do below.

In this partially informative equilibrium, each type of advisor must find the specified report optimal given the bribe offered, and T must not want to change the bribe. Define $\bar{V}_t(l)$ as the expected reputation value of the type t advisor resulting from $m = h$ when $s = l$, $\bar{V}_t(l) = \theta_l V_t(\hat{\lambda}(h, S)) + (1 - \theta_l)V_t(\hat{\lambda}(h, F))$, and likewise for $s = h$ is $\bar{V}_t(h) = \theta_h V_t(\hat{\lambda}(h, S)) + (1 - \theta_h)V_t(\hat{\lambda}(h, F))$.

In the equilibrium, the proposed advisor strategy is $m_b(h) = m_b(l) = m_g(h) = h$; $m_h(l) = l$. The conditions such that both types of advisor find these messages to be incentive compatible are:

$$m_b(l) = h \implies q_l \geq q_1 = V_b(1) - \bar{V}_b(l) + \alpha_b((1 - \theta_l)L - \theta_l G) \tag{4}$$

$$m_b(h) = h \implies q_h \geq q_2 = V_b(1) - \bar{V}_b(h) - \alpha_b(\theta_h G - (1 - \theta_h)L) \tag{5}$$

$$m_g(l) = l \implies q_l \leq q_3 = V_g(1) - \bar{V}_g(l) + \alpha_g((1 - \theta_l)L - \theta_l G) \tag{6}$$

$$m_g(h) = h \implies q_h \geq q_4 = V_g(1) - \bar{V}_g(h) - \alpha_g(\theta_h G - (1 - \theta_h)L) \tag{7}$$

We next look for conditions under which the necessary bribes are indeed optimal for the third party. For each of the above we can find the range of payments q that would support the advisor strategy. If $s = l$, the condition in (4) above implies that $q_l \geq V_b(1) - \bar{V}_b(l) - \alpha_b(\theta_l G - (1 - \theta_l)L)$ and the third condition in (6) implies $q_l \leq V_g(1) - \bar{V}_g(l) - \alpha_g(\theta_l G - (1 - \theta_l)L)$. The expected payoffs to the third party, given $s = l$, are $U^T = (1 - \lambda)(w - q_l)$. For the q_l to be optimal for T, it must be that T does not want to lower the bribe so that $m_b(l) = l$ (and $U^T = 0$), and does not want to raise the bribe so that $m_g(l) = h$. The first implies that $w \geq V_b(1) - \bar{V}_b(l) - \alpha_b(\theta_l G - (1 - \theta_l)L)$ which can be written as,

$$G \geq \frac{1 - \theta_l}{\theta_l} L - \frac{w}{\theta_l \alpha_b} + \frac{[V_b(1) - \bar{V}_b(l)]}{\theta_l \alpha_b} \tag{8}$$

Not wanting to raise the bribe means $(1-\lambda)(w-q_l) \geq w-\hat{q}_l$, where $\hat{q}_l$ is the bribe necessary to convince the good advisor to lie. This becomes

$$(1-\lambda)[w-[V_b(1)-\bar{V}_b(l)]+\alpha_b(\theta_l G-(1-\theta_l)L)] \geq w-[V_g(1)-\bar{V}_g(l)]+\alpha_g(\theta_l G-(1-\theta_l)L)]$$

This results in a condition which requires that G be not too large as below,

$$G \leq \frac{1-\theta_l}{\theta_l}L - \frac{\lambda w}{\theta_l[\alpha_g-\alpha_b(1-\lambda)]} + \frac{[V_g(1)-\bar{V}_g(l)]-(1-\lambda)[V_b(1)-\bar{V}_b(l)]}{\theta_l[\alpha_g-\alpha_b(1-\lambda)]}$$

If $s=h$, then (5) and (7) respectively imply that q_h be sufficiently large as shown below,

$$q_h \geq V_b(1)-\bar{V}_b(h)-\alpha_b(\theta_h G-(1-\theta_h)L)$$

$$q_h \geq V_g(1)-\bar{V}_g(h)-\alpha_g(\theta_h G-(1-\theta_h)L).$$

An immediate implication is that for α_b close enough to zero in an informative equilibrium, T offers a strictly positive bribe even if $s=h$ and $d=1$ is optimal for the decision maker. As long as $V_b(1)-\bar{V}_b(h) > \alpha_b(\theta_h G-(1-\theta_h)L)$, a positive fee will be necessary to get the bad advisor to recommend a good product. In other words, if the state is high a bad advisor might have to be provided a monetary incentive to not lie about even about the high state. This is because all advisors face the cost of reputation loss in truly reporting the high state. The only way to induce a recommendation from the bad advisor in this case is to compensate for the loss of reputation with a payment. The size of the payment is dependent upon the extent to which the advisor cares about the decision maker's utility. If the advisor is more altruistic, the payment needed to compensate for the reputational loss is smaller.

A second and perhaps more interesting implication is that *a positive bribe may be necessary to get even the good advisor to truthfully report the high state.* This is analogous to the political correctness effect. Indeed, it is possible that it is this concern that determines the size of the payment that the third party offers. For example, if the reputational value for incorruptibility: i.e., being recognized for certain as a good advisor is substantially higher for the good advisor than for the bad advisor (i.e., $V_g(1) >> V_b(1)$), then it is possible that the payment that T makes is determined by the need to make the good rather then the bad advisor to tell the truth about the favorable state h.

Let us now examine the incentive of the third-party. For the bribe to be optimal for T, it must be that he would not prefer to cut the bribe to zero, and that he would not prefer to drop the bribe to a level that causes only one type to set $m = h$. Not cutting the bribe means $G \geq \frac{1-\theta_h}{\theta_h} L - \frac{w}{\theta_h \alpha_t} + \frac{V_t(1) - \bar{V}_t(h)}{\theta_h \alpha_t}$ and this must hold for both types. Note that as long as $w > V_t(1) - \bar{V}_t(h)$, this condition does not bind (the state doesn't even matter unless $G \geq \frac{1-\theta_h}{\theta_h} L$). Not wanting to drop the bribe for one type depends on which type is cheaper to bribe. This will be the bad advisor unless the bad advisor cares a lot more about reputation than the good advisor. Suppose we assume the natural case that the bad advisor is easier to bribe, then the condition is,

$$w - [V_g(1) - \bar{V}_g(h) - \alpha_g(\theta_h G - (1-\theta_h)L)] \geq (1-\lambda)[w - [V_b(1) - \bar{V}_b(h) - \alpha_b(\theta_h G - (1-\theta_h)L)]]$$

$$G \geq \frac{(1-\theta_h)L}{\theta_h} + \frac{V_g(1) - \bar{V}_g(h) - (1-\lambda)[V_b(1) - \bar{V}_b(h)]}{\theta_h[\alpha_g - (1-\lambda)\alpha_b]} - \frac{\lambda w}{\theta_h[\alpha_g - (1-\lambda)\alpha_b]}$$

We can now compare the range of G for which there is an informative equilibrium with no reputation effects to that for which there is an informative equilibrium with reputation effects. As we have already noted, the conditions for complete honesty from both types are the same in both cases. So the interesting comparison is over the range where only the good advisor is honest. With no reputation effects, there was partial communication when

$$G \in (\max\{\frac{1-\theta_h + (1-\lambda)(1-\theta_l)}{\theta_h + (1-\lambda)\theta_l} L, \frac{1-\theta_l}{\theta_l} L - \frac{w}{\theta_l \alpha_b}\}, \frac{1-\theta_l}{\theta_l} L - \frac{\lambda w}{\theta_l[\alpha_g - (1-\lambda)\alpha_b]}).$$

With reputation effects the conditions that must be satisfied are

$$G \geq \frac{1-\theta_l}{\theta_l} L - \frac{w}{\theta_l \alpha_b} + \frac{[V_b(1) - \bar{V}_b(l)]}{\theta_l \alpha_b}$$

$$G \leq \frac{1-\theta_l}{\theta_l} L - \frac{\lambda w}{\theta_l[\alpha_g - \alpha_b(1-\lambda)]} + \frac{[V_g(1) - \bar{V}_g(l)] - (1-\lambda)[V_b(1) - \bar{V}_b(l)]}{\theta_l[\alpha_g - \alpha_b(1-\lambda)]}$$

$$G \geq \frac{1-\theta_h}{\theta_h} L - \frac{w}{\theta_h \alpha_t} + \frac{V_t(1) - \bar{V}_t(h)}{\theta_h \alpha_t};$$

and assuming it's cheaper to bribe the bad advisor when $s = h$,

$$G \geq \frac{1-\theta_h}{\theta_h} L - \frac{\lambda w}{\theta_h[\alpha_g - (1-\lambda)\alpha_b]} + \frac{V_g(1) - \bar{V}_g(h) - (1-\lambda)[V_b(1) - \bar{V}_b(h)]}{\theta_h[\alpha_g - (1-\lambda)\alpha_b]}$$

Finally, the condition $G \geq \frac{1-\theta_h+(1-\lambda)(1-\theta_l)}{\theta_h+(1-\lambda)\theta_l} L$ is still valid, since if this is false with partial communication then the decision maker will set $d = 0$ even given the report $s = h$. Of the four conditions, the last two matter only if the good advisor values reputation a lot more than the bad advisor. The first condition implies that there are values of G for which communication is possible with no reputation effects, but impossible with reputation effects. The second condition says the opposite. So the concern for reputation can be good or bad for communication, depending on parameters. Consider the first condition which implies that the third party does not want to lower the bribe so that the bad advisor will find it optimal to truly report the low state. This is more easily satisfied if the value of incorruptibility for the bad advisor is low enough (i.e., low $V_b(1)$) and if the reputational damage for the bad advisor from misreporting the low state is small. In this case the greater reputation of the bad advisor, interferes with communication and decreases the range over which honest communication can take place as compared to the case with no reputation effects. The second condition implies that the third party has no incentive to raise the bribe to induce the good advisor to lie about the low state. This is more easily satisfied when the value for incorruptibility for the good advisor is high and when the good advisor stands to suffer a large reputational loss for lying about the low state. Clearly in this case reputation effects are good in the sense that they enhance the range over which honest communication is possible.

4.1 T knows the Advisor Type

We have assumed that the decision maker and the third party are symmetrically uninformed about the advisor's type. Here, we consider the case where the third party knows the advisor type while the decision maker does not. This can be the case with movie critics or stock analysts, where the third party has a greater stake and ability in knowing about the advisor than any individual decision maker.

If the third party knows the advisor's type, it can offer a more efficient bribe. One would expect this to make information transmission more difficult. T is more willing to offer a bribe that changes a type g advisor's message, since he knows he will not be overpaying for a type b advisor's message. Bribes are also more efficient when $s = h$: the third party does not waste bribes on someone who would have recommended the product anyway.

For a possible full communication equilibrium with honest reporting by both types of advisor, it is sufficient to check whether it is worthwhile to offer a bribe that the type b advisor would accept. So the results from the basic model remain valid. In an equilibrium in which only the good advisor is honest, advisor strategies are no different: the bribe necessary to get the advisor to change his report are the same as before, and the necessary conditions on q (q_1 to q_4) are the same as before. The difference will be in T's payoffs, which now includes four possible bribes q_s^t.

The necessary conditions for T's strategy are $w \geq \max(q_1, q_2, q_4)$ and $w \leq q_3$. The first condition is also necessary in the base model where the third party also knows the advisor type. The second condition is weaker: when T does not know t, the condition is: $(1-\lambda)(w-q_1) \geq w - q_3$, or $w \leq \frac{q_3-(1-\lambda)q_1}{\lambda}$. So as long as $q_3 > q_1$ (that is, as long as the bribe needed to get a good advisor to lie is larger than the bribe needed to get a bad advisor to lie), the conditions necessary for communication are stricter when the third party knows t. Or in other words, no communication in the base model implies no communication when T knows t.

4.2 Mixed Strategies

We know that in the base model (with no reputation effects), honest communication is an equilibrium if

$$G \leq \frac{1-\theta_l}{\theta_l}L - \frac{w}{\theta_l \alpha_b},$$

and partial communication is an equilibrium if

$$\frac{1-\theta_h+(1-\lambda)(1-\theta_l)}{\theta_h+(1-\lambda)\theta_l}L \leq G \leq \frac{1-\theta_l}{\theta_l}L - \frac{\lambda w}{\theta_l[\alpha_g-(1-\lambda)\alpha_b]}.$$

This leaves the possibility of an intermediate range of G where neither of these pure strategies is an equilibrium (if $\frac{1-\theta_l}{\theta_l}L - \frac{w}{\theta_l\alpha_b} < \frac{1-\theta_h+(1-\lambda)(1-\theta_l)}{\theta_h+(1-\lambda)\theta_l}L$). In this range honesty is not an equilibrium since T would offer a bribe that convinces a bad advisor to lie, but partial communication is not decisive.

Is there an informative equilibrium in mixed strategies, where the report is decisive? In such an equilibrium the type b advisor must be honest with a positive probability, and therefore indifferent between accepting the bribe and not. Since a small increase in the bribe would break this indifference, this mixed strategy requires that $q = w$, so that T is unwilling to increase the bribe. This means that $w = \alpha_b[(1-\theta_l)L - \theta_l G]$, or $G = \frac{1-\theta_l}{\theta_l}L - \frac{w}{\theta_l \alpha_b}$, which contradicts the assumption that $G > \frac{1-\theta_l}{\theta_l}L - \frac{w}{\theta_l \alpha_b}$. So, there is no mixed strategy in this gap. Thus with no reputation effects there cannot be a mixed strategy equilibrium.

In the base model with reputation effects, however, there may be a similar mixed strategy in equilibrium. Honest communication is still an equilibrium if $G \leq \frac{1-\theta_l}{\theta_l}L - \frac{w}{\theta_l \alpha_b}$, while partial communication introduces reputation effects, so that a necessary condition is $G \geq \frac{1-\theta_l}{\theta_l}L - \frac{w}{\theta_l \alpha_b} + \frac{[V_b(1) - \bar{V}_b(l)]}{\theta_l \alpha_b}$.

When G falls between these two ranges, T is not willing to pay a bribe large enough to compensate for both the bad advisor's altruism and his lost reputation. Yet note that the lost reputation is decreasing in $\Pr[m(l) = l]$. Therefore if the type b advisor is sometimes honest, then the lost reputation from lying will not be so great. Suppose that $q = w$, so that T is indifferent as to whether or not he induces a decision $d = 1$. In this case, there should exist a mixed strategy for a type b advisor such that he is just indifferent between $m(l) = l$ and $m(l) = h$. Calculating this strategy will of course require an explicit function for $V(\lambda)$.

4.3 Other types of informative communication

Reputation effects introduce the possibility of other types of partially informative communication.

i. The good advisor always reports l and only the bad advisor is honest; that is, that $m_g(h) = m_g(l) = l$, $m_b(h) = h$, $m_b(l) = l$. For $m_b(h) = h$ we must have $\alpha_b(\theta_h G - (1-\theta_h)L) + q_h \geq \tilde{V}_b(l) - V_b(0)$, where $\tilde{V}$ refers to the expected value of reputation after reporting l. For $m_g(h) = l$, we must have $\alpha_g(\theta_h G - (1-\theta_h)L) + q_h < \tilde{V}_g(l) - V_g(0)$. So such an equilibrium requires that a good advisor attaches a substantially higher value to reputation than does a bad advisor.

ii. The good advisor always reports h and only the bad advisor is honest: $m_g(h) = m_g(l) = h$, $m_b(h) = h$, $m_b(l) = l$. Here, the report l lowers reputation and means you don't get the bribe. We must have $\alpha_b(\theta_l G - (1-\theta_l)L) + q_l + \tilde{V}_b(h) < V_b(0)$ and $\alpha_g(\theta_l G - (1-\theta_l)L) + q_l +$

$\tilde{V}_g(h) > V_g(0)$. This can be true if the bad advisor cares a lot less about reputation than the good advisor.

iii. The good advisor is always honest, and the bad advisor always reports l: $m_g(h) = h$, $m_g(l) = l$, $m_b(h) = m_b(l) = l$. Again, the report l lowers the advisor's reputation and means that he does not get the bribe. This cannot be and equilibrium. For the bad advisor, we must have $\alpha_b(\theta_h G - (1-\theta_h)L) + q_h < \tilde{V}_b(l) - V_b(1)$. But the left-hand side is positive and the right-hand side is negative.

5 Conclusion

A decision maker seeking advice must always be concerned with the independence of the advisor he consults. In many circumstances, there is the opportunity for those with a stake in the decision maker's action to try to influence the advisor. We generally think of reputation as reinforcing the independence of the advisor, since the appearance of bias will undermine the advisor's influence in the future. Our analysis suggests that this desire to appear independent can cut both ways: it can help prevent an advisor from acceding to the influence of interested third parties, but it can also prevent the advisor from recommending an action that he knows the decision maker should take, out of a desire to appear incorruptible.

Thus side payments or bribes from sellers or interested third-parties can have two distinct roles. The obvious role of a side- payment is to influence the bad advisor to lie about the bad state (i.e., a poor quality product). But bribes might have a second more interesting role: they might be offered to compensate even a good advisor to truthfully report a good state. In this case these bribes are a compensation for the loss of reputational capital of the good advisor. An implication of our results is that, when we observe a seller attempting to influence an advisor, we should not necessarily infer that the seller is trying to encourage bad advice. Even if when he knows he is offering the buyer good advice, the advisor may require a payment to compensate for his loss of reputational capital.

We show that information transmission from the advisor is decreased with better third-party knowledge about the state. Similarly, if the third party knows the advisor's type better than the decision maker, then it becomes more difficult for the advisor to credibly convey useful information to the decision maker.

References

Banerjee, A. and D. Fudenberg. "Word of Mouth Learning," *Games and Economic Behavior* 46 (2004) 1-22.

Biglaiser, G. "Middlemen as Experts," *RAND Journal of Economics* 24(2) (1993) pp. 212-223.

Biglaiser, G. and J. Friedman. "Middlemen as Guarantors of Quality," *International Journal of Industrial Organization* 12 (1994) pp. 509-31.

Biyalogorsky, E., E. Gerstner, and B. Libai. "Customer Referral Management: Optimal Reward Programs," *Marketing Science* 20(1) (2001) 82-95.

Buttle, F. "Word of Mouth: Understanding and Managing Referral Marketing". *Journal of Strategic Marketing* 6 (1998) 241-254.

Crawford, V. and J. Sobel. "Strategic Information Transmission," *Econometrica* 50(6) (1982) 1431-1451.

Ellison, G. and D. Fudenberg. "Word of Mouth Communication and Social Learning," *Quarterly Journal of Economics* 90(1) (1995) 93-125.

Godes D. and D. Mayzlin "Using Online Conversations to Study Word-of-Mouth Communication," *Marketing Science* 23(4) 2004 545-560.

Krishna, V. and J. Morgan. "A Model of Expertise," *Quarterly Journal of Economics* 116(2) (2001) 747-775.

Morris, S. "Political Correctness," *Journal of Political Economy* 109(2) (2001) 231-265.

Morgan J. and P. Stocken "An Analysis of Stock Recommendations" *Rand Journal of Economics*, 34(1) 2003 183-203.

Ottaviani, M. and P. N. Sorenson. "Professional Advice: The Theory of Reputational Cheap Talk," Working Paper (2001).

Sarvary Miklos "Temporal Differentiation and the Market for Second Opinions" *Journal of Marketing Research*, 39(2) (2002) 129-36.

Scharfstein, D. and J. Stein. "Herd Behavior and Investment," *American Economic Review* 80(3) (1990) pp. 465-479.