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ABSTRACT

Consumers solve many agency problems, by pointing out when they believe that agents have made mistakes. This paper considers the role that consumers play in inducing efficient behavior by agents. I distinguish between two case: those where consumers have similar preferences to the principal, and those where consumer preferences diverge from those of the principal. In the former case, allowing consumer feedback improves allocations, and increasing consumer information is unambiguously beneficial. In the case where consumers disagree with principals over desired outcomes, which characterizes many benefits given by the public sector, consumers feedback about the performance of agents can reduce welfare. This may result in efficiently restricting the ability of consumers to complain about agent performance.

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1 Introduction

Consumers play a central role in solving agency problems. For example, someone who receives poor service in a restaurant or store can ask to "see the manager". Similarly, a person incorrectly denied unemployment benefit or unlawfully arrested has opportunities to appeal the decision to a higher authority. Consumers feedback to firms comes in a variety of forms, such as customer satisfaction surveys, appeals, suits, complaints machanisms, "focus groups", market research surveys etc., and is used for a host of reasons.[1] One reason to solicit (or perhaps a byproduct of soliciting) consumer feedback is to effectively monitor the actions of employees. The purpose of this paper is to understand how well they do so.

Consumers are a relatively cheap way of getting information on the performance of employees. Yet agency theory has largely ignored their role: instead, monitoring precision typically appears as an exogenous parameter of the agency problem. (See Prendergast, 1999, for a review.) I argue here that a careful focus on consumers can help understand the ability of firms to resolve agency problems, where their role depends on the *congruence* in preferences between consumers and principals.[2]

The idea can be easily explained by a pair of examples. First, consider a restaurant customer who receives poor service. Both the customer and the owner of the restaurant likely wish that the customer has good service, as the restaurant's success depends on it. I show below that in this situation, the agent can be effectively monitored by the consumer, as the consumer has the "right" objectives. In effect, the incentives of the customer are aligned with those of the principal, which both improves incentives and oversight to correct mistakes. By contrast, now consider an applicant for unemployment benefits. Here, there is considerable divergence in the preferences of the Department of Labor and an applicant for unemployment benefit: the applicant always wants to be approved for benefits, while the Department wishes to deny unqualified candidates. I show below that in this latter case not only are customers less useful, but more surprisingly, using consumer feedback can be harmful to efficiency.

The model below has the following features. First, a good has to be allocated to a consumer, where the optimal allocation depends on some information available to the agent. Second, she can exert effort to improve the quality of her information. Third, monitoring by the principal is costly, so he would like some information that an error has occurred before intervening. This is where

[1] Such feedback is useful to identifying consumer preferences, pointing out defects in product design, correcting inadvertant mistakes, and so on.

[2] See Aghion and Tirole, 1997, for other work stressing the importance of congruence in preferences, though in their case they emphasize correlation in preferences between agents and principals.

consumers play a role: the firm can give consumers the opportunity to complain, which can help to focus further investigation. The issue addressed here is whether an equilibrium outcome exists where this opportunity to complain improves agent incentives.

Initially consider the case where consumers have preferences that correspond closely with those of the principal. Not surprisingly, I show that an equilibrium outcome always exists where (i) the ability to complaint increases agent effort, and (ii) complaints serve to focus the attention of the principal. Thus, when consumers have a similar ranking of preferences to the principal, they can effectively play "watchdog" on the agent in such a way that their interventions increase social welfare.[3] I also show that more informed consumers increase efficiency in this case, both through more effort and better oversight of errors.

Now assume that consumers have different preferences to the principal, as in the unemployment benefits case. In this instance, the consumer benefits from some allocations that the pricipal would wish to change, in that the consumer does not complain when he inefficiently benefits from the decision made by the agent.[4] This causes three problems. First, when the consumer is given benefits, he never complains, which makes oversight less effective as the principal no longer knows when to intervene. Second, incentives to exert effort by the agent are lower, as her errors are less likely to be pointed out by the consumer.

These first two reasons do not make consumer feedback harmful, merely less useful than in the congruent case. However, a third problem is that it is no longer guaranteed that consumers can be used to increase incentives. This is because the agent realises that her mistakes are more likely to be observed if she denies the benefit to the consumer than if she simply gives him what he wants.[5] But if agents wish to avoid such investigations, as arises in this paper for career concerns reasons, there is a temptation to simply capitulate to the consumer to avoid investigation. This incentive gives rise to a *truth-telling* condition, which must be satisfied in order to induce the agent to deny benefits to a consumer. Loosely, the agent has to feel that an investigation will not harm her significantly: otherwise, she cannot be induced to allocate goods according to her information. Instead, she always gives the benefit to the consumer, which is clearly inefficient. If the truth-

[3]There are two reasons for this. First, consumers (at least probabilistically) point out inefficient allocations, and the principal can intervene better to correct these mistakes. Second, consumers can be used to heighten incentives for agents to exert effort, by increasing (reducing) the likelihood of investigations when mistakes are (not) made.

[4]For example, not many suspects could be trusted to turn themselves in if the police err in not arresting them, nor do welfare recipients who do not qualify often send back the checks. Finally, it is rare for a student who receives a higher grade than they deserve to point this out.

[5]For example, an INS official could allow an unqualified candidate to enter the country rather than avoid the type of case reported in the New York Times, 2000, where the officials were accused of racism. Similarly, consider the effect of the recent increases in oversight of the IRS. This has resulted in "a sharp roll-off in tax investigations as auditors, fearing for their bureaucratic lives, proceed timidly..[as]..tax collectors are too worried about their jobs to be aggressive" (Star Tribune, 2000).

telling condition is not satisfied, I show the principal may choose to shut down any feedback from consumers. Although obviously inefficient, it implies that agents are shielded from the threat posed by consumers.[6]

Consumers play a more ambiguous role here than when preferences are congruent. Consider the effect of consumers becoming more informed. This has two effects on the ability to induce the agent to deny benefits to the consumer. First, holding agent effort fixed, increasing consumer knowledge makes truth-telling *more difficult* to satisfy. The reason for this is intuitive: a more informed consumer can point out agent errors more effectively than can a less informed consumer. As a result, the temptation to capitulate to the consumer becomes more attractive the more informed he becomes. Second, there is a conflicting effect, which is that optimal effort is increasing in the consumer's knowledge. This effect relaxes the truth-telling condition (as the agent is more certain of her opinion, she is less worried about an investigation). This renders the effect of consumer knowledge on the truth-telling condition ambiguous. Despite this ambiguity, I show that it is always the case that for sufficiently good consumer knowledge, truth-telling can never be satisfied. On the other hand, when consumer are sufficiently badly informed, truth-telling is satisfied. As a result, more informed consumers can harm allocations.

I conclude by studying a case where effort costs are discrete. Not surprisingly, the efficiency of the congruent outcome is (weakly) increasing in the quality of the consumer's information. In the non-congruent case, the outcome becomes more complex in that now where exist a critical value of consumer knowledge *above* which effort exert is exerted (as above), but *below* which truth-telling arises.[7] This implies that at best there is a non-monotonic relationship between consumer knowledge and efficient use of consumers, where they are used up to some quality level, but cannot be used beyond that level as the truth-telling condition can no longer be satisfied. In this case, less informed consumers (over some range) improve allocations.

[6] See Cannon (2000) for examples of obstacles placed in the path of complaints about police officers, with what appears to be the implicit sanction of superiors.

[7] For levels of consumer knowledge above this level, the agent is sufficiently threatened by the consumer that he cannot be induced to deny him benefits.

2 The Model

An allocation A must be made to a consumer, where A can take on a value of 0 or 1. The social surplus from the allocation depends on a parameter α and is given by

$$S(A;\alpha) = \begin{cases} 1 & \text{if } A = \alpha, \\ 0 & \text{otherwise.} \end{cases} \tag{1}$$

Thus social surplus is positive only if A is properly matched to the underlying environment, α. The true value of α is unknown and can take two values $\alpha = 1$ or $\alpha = 0$, which occur with equal probability.

Information and Objectives There are three actors in this model: a principal, an agent, and a consumer. First, the agent collects information on α; she observes α_a which is correct with probability $q \geq \frac{1}{2}$, where with probability $1 - q$, she observes $\alpha_a \neq \alpha$. The precision of the agent's estimate depends on an unobserved effort decision by her, where she chooses effort $e \geq 0$ at a disutility of e. Let $q(e)$ be the precision of the agent's estimate, where $q(0) \geq \frac{1}{2}, q'(e) > 0, q''(e) \leq 0$, and $q(\infty) < 1$. The agent's objective is to maximize wages minus effort costs.

Second, the consumer observes a signal on α, which is correct with probability s, where $1 > s > \frac{1}{2}$, where with probability $1 - s$, she observes $\alpha_a \neq \alpha$. The signals of the consumer and agent are (conditionally) independent. Rents earned by the customer play a central role in their ability to alleviate agency concerns. Accordingly, let $V(A, \alpha)$ be the utility obtained by the consumer if his type is truly α and the allocation is A.

Third, the principal is uninformed unless he carries out an investigation. To model a role for investigations, I assume that the principal chooses a probability of observing a signal on the true state of nature, α, at some cost. Specifically, the principal chooses a probability ρ with which he observes α, at a cost $\kappa(\rho)$, where $\kappa'(\rho) > 0, \kappa''(\rho) > 0, \kappa'(0) = 0, \kappa(0) = 0$, and $\kappa'(1) \geq 1$. For simplicity, throughout most of the paper I assume that monitoring costs are quadratic: $\kappa(\rho) = \frac{\rho^2}{2}$. The objective of the principal is to maximize social surplus S.[8]

Actions and Incentives The agent has two actions: (i) how much effort to exert, e, and (ii) what allocation to recommend, $a(\alpha_a)$. Based on this recommendation, the consumer can send a message

[8]The monetary transfers in this model, wages and the costs of complaint, involve no deadweight loss, so the principal maximizes static welfare. This also implies that the principal does not internalize the career concerns of the agent, but as effort is assumed suboptimally low, this will not change the results.

$m \in \{n, c\}$ to the principal, where the message n means that no complaint is made and message c implies that a complaint has been made. I assume that the messages are meant literally, so that I can ignore the case where message n implies disagreement and a complaint means agreement with the agent. The principal charges the consumer a price $p \geq 0$ to make a complaint (i.e., send message c). The consumer chooses his message to maximize his utility minus any complaint cost.

The principal chooses (i) when to monitor, where he investigates with probability $\rho(a, m)$, (ii) the allocation, A, and (iii) the price of making a complaint. He cannot commit to the probability of monitoring, but instead makes oversight decisions in a subgame perfect fashion.[9] If the investigation turns up evidence that the agent made a mistake, the principal overturns the agent's decision and allocates the correct one, $A = \alpha$. If the investigation concurs with the agent's findings, or there is no evidence obtained by the principal, the decision is left unchanged from that suggested by the agent, $A = \alpha_a$.[10]

Career Concerns The difficulty with using consumers in this model is that they can focus investigations on the actions of the agent, which in expectation harm her. This requires that the agent would like to avoid investigation. I assume, as in most discussions of the incentives of bureaucrats (such as Wilson, 1989), that career concerns (perceptions of ability) affect the wage of the agent. However, investigations lead to more information on the agent's performance in such a way that the agent would like to avoid the spotlight.

To model this, assume that agents differ in their ability, and is unknown to all parties. The agents are of two types; those that are always right, and those that are always wrong. The fraction of agents that are always right is given by $q(e)$.[11] The agent's wage depends on perceptions of her ability held by the "labor market",[12] and is given by $E[q(\hat{e})|\Omega]\Delta$, where Ω is the information available to the labor market and $\hat{e}$ is the expected level of effort. The agent's objective is to maximize $E_e[q(\hat{e})|\Omega]\Delta - de$. Δ is exogenous, and assumed to be sufficiently small that e is suboptimally low.[13] As a result, the principal (and ex ante the agent) prefers higher effort.

[9] See Prendergast, 2001, for the case where commitment is possible.

[10] For some values of s and $q(e)$, this allocation mechanism is obviously inefficient, and a more efficient allocation mechanism could be to allow the consumer to make an allocation which remains unchanged unless the principal investigates. For the allocation mechanism proposed here to be efficient, it must be the case that either q is large relative to s or consumers cannot be trusted to allocate the good effiently, due to non-congruent preferences. Assume that one of these conditions holds throughout the paper.

[11] Thus, the return to effort is to increase the fraction of agents who make correct decisions. The interpretation of this is that effort results in greater capacity to do a task in future, and can be seen as unobserved general training.

[12] The "labor market" really refers to any external constituencies that can affect her welfare. For instance, a police officer accused of using excessive force may face costs in the form of jail time, which is generated by pressure from the population rather than another potential employer.

[13] This would typically be the case whenever there is a marginal cost to using wages as the mechanism of providing

I assume that the actions of an agent are more observable when an investigation occurs. Formally, if an investigation occurs, outside constituencies (the labor market) observe all information available to the principal, but if no investigation occurs, the labor market observes nothing of the agent's actions. As will be seen below, this asymmetry generates an ex ante incentive to avoid investigations, as is required for the results.[14]

Timing First, the principal chooses $p \geq 0$, and nature assigns α to the consumer. Second, the agent exerts effort. Third, the customer and the agent privately observe their signals. Next, the agent proposes an allocation a. Following this, the customer send a message m, i.e., he complains or not. The principal then monitors with probability $\rho(a, m)$ in the ex post optimal fashion. If he observes α, he allocates $A = \alpha$ and pays the agent according to the contract above. Otherwise, the agent's recommendation is implemented.

The Incentive to Complain The efficiency of monitoring depends on the ability of consumers to credibly alert the principal that a mistake has been made; this is what focuses investigations. One feature which plays a central role in understanding the role of the consumer is the congruence in preferences between him and the principal. Accordingly I consider two situations.

- *Congruent Preferences:* The first case that I consider below is where consumers rank outcomes similarly to the principal. In this case, I assume that $V(1,1) = V(0,0) > V(1,0) = V(0,1)$.
- *Divergent Preferences:* I also consider the case where consumers rank outcomes differently to the principal. In this case, I assume that $V(1,1) = V(1,0) > V(0,0) = V(0,1)$. The agent simply prefers allocation 1 to allocation 0.

Equilibrium The objective here is to characterize pure strategy Bayesian Nash equilibria of the model. I assume that when a Pareto-dominating equilibrium exists, it will be chosen.

3 Outcomes Where Consumers Induce Effort Exertion

I first consider whether consumers can be used to alleviate the agency problem, by inducing the agents to exert more effort when they realise that complaints against them will focus investigations.

incentives, where that marginal cost of incentive provision is traded off against its benefits. This assumption is made merely to illustrate the increased surplus that is likely to arise from improving monitoring.

[14] See Milbourn, Shockley, and Thakor, 2001, for other work on how limited observability of outcomes affects career concerns problems.

Complaints are useful in this model if they are sent when the consumer disagrees with the agent's recommendation, but not otherwise. To analyze the feasibility of this, I distinguish between two cases: (i) those where consumers always complain when a mistake has been made (the *congruent preferences* case), and (ii) where consumers consumers only complain when denied a benefit (the *divergent preferences* case). I consider each in turn.

3.1 Congruent Preferences

I begin by considering the case where consumers can be induced to always complain when their information disagrees with the recommendation. This arises when $V(1,1) = V(0,0) > V(1,0) = V(0,1)$. There are a series of incentives, each of which have to be satisfied for an equilibrium of this type to exist.

1: The Incentive to Complain The principal would like to know whether the consumer's signal agrees with that of the agent. For the signal to be informative, it must be that he complains only when his signal disagrees: otherwise, the complaint means nothing. Consider how the principal can make complaints credibly reveal whether the customer disagrees with the recommendation of the agent.

Let $\rho^*(a,m)$ be the equilibrium probability of monitoring, and p be the cost of making a complaint. Then for complaints to be informative when the agent proposes allocation a it must be the case that the cost of complaint is sufficiently low to warrant making one when the consumer disagrees, but high enough to deter complaints when he agrees. The necessary condition is

$$\frac{p}{\frac{(1-s)(1-q)}{qs+(1-s)(1-q)}[\rho^*(a,c)-\rho^*(a,n)]} \geq [V(\tilde{a},\tilde{a}) - V(a,\tilde{a})] \geq \frac{p}{\frac{s(1-q)}{q(1-s)+s(1-q)}[\rho^*(a,c)-\rho^*(a,n)]}. \quad (2)$$

To see this, consider first the case where the consumer disagrees with the principal. In this instance, one and only one of the parties is correct: the likelihood that the consumer is correct is $\frac{s(1-q)}{q(1-s)+s(1-q)}$. Conditional on this, complaining has a marginal return of $(\rho^*(a,c)-\rho^*(a,n))[V(\tilde{a},\tilde{a})-V(a,\tilde{a})]$. In order to induce a complaint when the comsumer disagrees, the price must be set low enough that the second condition holds. But equally, the price must be set high enough that the consumer does not complain when he agrees with the agent's recommendation. As the likelihood of being both incorrect in this case is $\frac{(1-s)(1-q)}{qs+(1-s)(1-q)}$, the price must be set high enough that the first inequality holds.

As $s > \frac{1}{2}$, there always exists a price to satisfy both parts of this inequality. As the transfers

between the principal and the agent involve no deadweight loss, this means that the principal can induce revealing complaints for any allocation at no ex ante cost.

2: Truth-telling The next issue to address is whether the agent can be induced to recommend his true belief, i.e., choose $a = \alpha_a$. When $V(a, a) > V(a, \tilde{a})$, truth-telling is not a binding constraint when monitoring is set at its ex post optimal level.[15] Intuitively, this should not be surprising as the consumer wishes that the agent makes efficient allocations, and is more likely to complain when the agent chooses the allocation she believes is more likely to be incorrect.

3: The Incentive to Monitor In the case where the consumer complains only when she disagrees, the ex post optimal levels of monitoring for the quadratic case are the conditional likelihoods of an error, and are given by:

$$\rho^*(a, n) = \frac{(1-s)(1-q)}{qs + (1-s)(1-q)} \tag{3}$$

and

$$\rho^*(a, c) = \frac{s(1-q)}{q(1-s) + s(1-q)} \tag{4}$$

Not surprisingly, the principal monitors more after a complaint.

4: Effort Incentives Consider the incentives of the bureaucrat to collect better information. There are three wages that the agent can earn. First, if an investigation occurs and she is correct, she earns $\overline{w} = \Delta$, as she is revealed to be the agent who is always correct. Similarly, if the investigation occurs and she is wrong, she earns 0. However, if no investigation occurs, she earns w_0, which is the expected ability (times Δ), conditional on no investigation occurring. It is important to note that the absence of investigation is revealing of the ability of the agent, because it reveals that probabilistically no complaint was made against her. Specifically,

$$w_0 = \Delta \left[\frac{qs(1-\rho^*(a,n)) + q(1-s)(1-\rho^*(a,c))}{(qs + (1-q)(1-s))(1-\rho^*(a,n)) + (q(1-s) + s(1-q))(1-\rho^*(a,c))} \right], \tag{5}$$

which the term in brackets is the probability of being correct conditional on no investigation. This has a number of features. Let $\tilde{e}$ be the expected level of effort. First, $w_0 \geq \Delta q(\hat{e})$: the posterior is higher than the prior. This is because not being investigated increases the likelihood that the agent was right. Second, w_0 is increasing in s, and ranges from $q(\hat{e})$ as $s \to \frac{1}{2}$ to 1 as $s \to 1$. This

[15] Formally, if the consumer complains if and only if the agent errs, the truth-telling condition is that she reports $\alpha = a$ rather than a' only if $((1-q(e))s + q(e)(1-s))\rho^*(a,c) + (q(e)s + (1-q(e))(1-s))\rho^*(a,n) \geq (q(e)s + (1-q(e))(1-s))\rho^*(a,c) + ((1-q(e))s + q(e)(1-s))\rho^*(a,n)$ which will always be satisfied for $q(e) > \frac{1}{2}$ and $s > \frac{1}{2}$.

should not be surprising as more informed consumers strengthen this inference.

Then consider the agent's incentives. Her expected utility is given by

$$\frac{w_0}{2}[(1-\rho^*(a,c))(q(e)(1-s)+s(1-q(e)))+(1-\rho^*(a,n))(q(e)s+(1-q(e))(1-s))]+ \\ \frac{\Delta}{2}q(e)[s\rho^*(a,n)+(1-s)\rho^*(a,c)]-e. \quad (6)$$

The worker then chooses effort e^* to satisfy

$$q'(e^*)[w_0(2s-1)(\rho^*(a,c)-\rho^*(a,n))+\Delta s\rho^*(a,n)+\Delta(1-s)\rho^*(a,c)]=1 \quad (7)$$

with the second order condition trivially satisfied.

The Role of Consumers The importance of consumers can be measured by how well they can identify an error by the agent. At one extreme, $s \to \frac{1}{2}$, so that the consumer knows no more than the principal before he investigates. This is the case where consumers play no role in allocating assets. At the other extreme, consumers know the correct allocation ($s \to 1$). Consider the effect of increasing s on the efficiency of the outcome. First, holding agent effort fixed, increasing s improves efficiency for the simple reason that it allows the principal to better identify that an error has been made, and so improves the focus of investigations. This should be immediately clear from (3) and (4). But changes in s also affect effort choices. Equation (7) defines the equilibrium effort level, $e^*(s)$. Then simple differentiation yields

$$\frac{de^*}{ds}=\frac{2w_0-\Delta+(2s-1)\frac{dw_0}{ds}}{-2q''(e)[w_0(2s-1)(\rho^*(a,c)-\rho^*(a,n))+\Delta s\rho^*(a,n)+\Delta(1-s)\rho^*(a,c)]}>0, \quad (8)$$

as $\frac{dw_0}{ds}>0$ and $w_0>\frac{\Delta}{2}$.

Since the incentive to complain and the incentive to reveal information truthfully are not binding constraints, the principal can use consumers to induce effort exertion. Then as consumers increase effort (the case of $s=\frac{1}{2}$ is equivalent to not using consumers) and improve monitoring, Proposition 1 immediately follows.

Proposition 1 *Assume that $V(a,a)>V(a,\tilde{a})$. Then there exists a pure strategy equilibrium where (i) the agent exerts effort e^* and (ii) allocates $a=\alpha_a$. In this equilibrium, more informed consumers increase effort and the efficiency of allocations.*

This is the best case scenario for using consumers to heighten incentives, and arises for two

reasons. First, consumers are willing to reveal all relevant information by pointing out disagreement when the agent chooses either $a = 1$ and $a = 0$. This helps to focus investigations on those cases where error is most likely. But this has a second effect, which is that it increases incentives, as consumers serve to increase the likelihood of the agent being rewarded for correct decisions and penalized for incorrect decisions.

3.2 Divergent Preferences

The key step in the efficiency result above is that the consumer must be willing to report error in all states. In many situations, this is unlikely, as many benefits are not priced. As mentioned above, I assume here that the preferences of the consumer are independent of the true state where $V(1,1) = V(1,0) > V(0,0) = V(0,1)$. The agent simply prefers allocation 1 to allocation 0. The difficulty here is that the consumer now ranks outcomes differently to the principal which affects his incentive to complain. I consider each incentive constraint in turn.

The Incentive to Complain The consumer can no longer be induced to always complains when he disagrees with the agent. Instead, at best the consumer complains if an error has been made when he has been denied the good $a = 0$. As in the previous section, the principal must choose p, the cost of complaint, to make complaints credible for this case. It does so by choosing the same price as in (2): this gives the consumer the incentive to reveal truthfully when denied the asset.[16] This the incentive to complain can only be satisfied in one case here.

The Incentive to Monitor Monitoring now depends on the allocation proposed by the agent. If she allocates $a = 1$, the consumer never complains as any change in the allocation can only harm him. In this case, the likelihood of an error in equilibrium is $1 - q(e)$,[17] and so the principal always chooses

$$\tilde{\rho}(1, n) = 1 - q(e) \tag{9}$$

On the other hand, if she allocates $a = 0$, the principal chooses $\rho^*(0, c)$ and $\rho^*(0, n)$ as in (3) and (4).

[16] In general, one could imagine a case where the principal offers a bounty $p < 0$ which is given if the consumer "turns himself in", when given a benefit that he does not deserve. I ignore this here as such bounties have other costs. For example, consider the example of a police officer making arrests. The objective of the incentives not to commit crimes is to penalize those who are guilty. Then offering a bounty to suspects to turn themselves in has harmful incentives to avoid crime. See Prendergast, 2001, for further details on this.

[17] The principal does not observe effort and so must make an inference about effort. This inference is, however, correct in equilibrium.

Effort Incentives As above, there are three possible wages that can be earned. First, if an investigation occurs and she is vindicated, she earns $\overline{w} = \Delta$, while if the investigation occurs and she is wrong, she earns 0. However, if no investigation occurs, she earns w_0, which is given by

$$w_0 = \Delta \left[\frac{qs(1-\rho^*(0,n)) + q(1-s)(1-\rho^*(0,c)) + q(1-\tilde{\rho}(1,n))}{(qs+(1-q)(1-s))(1-\rho^*(a,n)) + (q(1-s)+s(1-q))(1-\rho^*(a,c)) + (1-\tilde{\rho}(1,n))} \right], \tag{10}$$

which the term in brackets is the probability of being correct conditional on no investigation. Compared to the case where the consumer always complains when she disagrees, w_0 is lower. This is because the absence of an investigation is less informative of error, as the agent could have been wrong but gave the benefit to the consumer, and the consumer did not complain. It is also the case that w_0 is increasing in s, and ranges from $q(\hat{e})$ as $s \to \frac{1}{2}$ to $\frac{1+q(\hat{e})}{2}$ as $s \to 1$.

Consider the case where the consumer complaints when denied the asset and disagrees. If the agent allocates $a = \alpha_a$, she chooses effort to maximize expected utility, which is given by

$$\frac{w_0}{2}[(1-\rho^*(0,c))(q(e)(1-s)+s(1-q(e)))+(1-\rho^*(0,n))(q(e)s+(1-q(e))(1-s))]+\frac{w_0}{2}(1-\tilde{\rho}(1,n)) + \Delta\frac{q(e)}{2}[s\rho^*(0,n)+(1-s)\rho^*(0,c)] + \frac{q(e)}{2}\Delta\tilde{\rho}(1,n) - e. \tag{11}$$

The agent's effort e^{**} is then given by

$$q'(e^{**})[\frac{w_0(2s-1)(\rho^*(a,c)-\rho^*(a,n))}{2} + \frac{\Delta s\rho^*(a,n)}{2} + \frac{\Delta(1-s)\rho^*(a,c)}{2} + \frac{\tilde{\rho}(1,n)}{2}] = 1. \tag{12}$$

The incentive to exert effort has qualitatively the same features as in (7). However, incentives are lower than in (7) for the reason that when $\alpha_a = 1$ the marginal return to being correct have decreased: previously, the consumer would point out errors (which increased incentives), whereas now there is less incentive in this state of nature.

For consumers to play this role, it must be that the agent reports truthfully, which I deal with below. If truth-telling can be satisfied, then increasing consumer information results in more effort:

$$\frac{de^{**}}{ds} = \frac{2w_0 - \Delta + (2s-1)\frac{dw_0}{ds}}{-2q''(e)[\frac{w_0(2s-1)(\rho^*(a,c)-\rho^*(a,n))}{2} + \frac{\Delta s\rho^*(a,n)}{2} + \frac{\Delta(1-s)\rho^*(a,c)}{2} + \frac{\tilde{\rho}(1,n)}{2}]} > 0, \tag{13}$$

as $\frac{dw_0}{ds} > 0$ and $w_0 > \frac{\Delta}{2}$. It is simple to show that the marginal effect of consumer information on incentives is lower than in the case where the consumer always points out errors: this is the first cost to using consumer feedback to alleviate agency problems.

Truth-Telling Unlike the previous section, truth-telling is by no means guaranteed. To see this, it should be obvious that the agent can be induced to reveal truthfully when $\alpha_a = 1$.[18] The case where $\alpha_a = 0$ is more difficult. Here the agent faces a choice between (i) honestly denying the consumer, knowing that with probability $1 - q(e)$, a complaint will be made, and (ii) giving the consumer his preferred choice, which though inefficient, at least causes no complaint.

If she harms the consumer, her expected utility is given by

$$\frac{q(e)}{2}\Delta[s\rho^*(0,n) + (1-s)\rho^*(0,c)]$$
$$+ \frac{w_0}{2}[(1-\rho^*(0,c))(q(e)(1-s) + s(1-q(e)) + (1-\rho^*(0,n))(q(e)s + (1-q(e))(1-s))] - e. \quad (14)$$

Some simple manipulations show that this is equivalent to

$$2q(e)\Delta - q(e)\Delta\tilde{\rho}(1,n) - w_0[1-\tilde{\rho}(1,n)] - e. \quad (15)$$

The utility from capitulating to the consumer and allocating $a = 1$ is given by $(1-q)\tilde{\rho}(1,n) + w_0[1-\tilde{\rho}(1,n)] - e$. Truth-telling then arises only if

$$2q(e)\Delta \geq 2w_0 - \tilde{\rho}(1,n)[2w_0 - \Delta]. \quad (16)$$

There is no guarantee that (16) is satisfied. The agent's incentives now depends on whether she is made better off by giving the customer what he wants or denying him benefits when $\alpha_a = 0$. If she lies, the consumer never complains, and the principal is left with the difficult problem of monitoring cases where the customer has not done him the favor of pointing out that a mistake has been made. The principal realises that an allocation of $a = 1$ could be because the consumer truly deserved the asset or because he was given it unfairly. As a result, the returns to monitoring are low, because many legitimate monitoring cases are pooled with those where the agent was correct. On the other hand, if she allocates $a = 0$ but is wrong, the consumer likely complains, which is informative that an error has been made. The tradeoff between these effects generates the willingness of the agent to harm the consumer.

The desire to avoid investigation arises from the assumption that the "labor market", the external constituencies that affect the agent's career prospects, are poorly informed without an investigation. Consider the agent who believes that the consumer should be denied the good. If

[18] This allocation is preferred by the customer, and since $q \geq \frac{1}{2}$, the bureaucrat knows that the likelihood of a complaint is lower if she offers the right allocation.

no investigation occurs, her wage increases, as it probabilistically reveals that the agent made the correct decision. But this is true independent of whether the agent recommends denying or giving the benefit to the consumer, as the labor market is uninformed without an investigation. The higher likelihood of the no investigation outome by capitulating to the consumer then makes this prospect potentially attractive.

The tradeoff faced by the agent depends on two important issues, to which I return below. First, how certain is the agent of her opinion? Increases in $q(e)$ relax (16), so all else equal, more effort by the agent makes truth-telling more likely. Second, how informative is the absence of an investigation about the ability of the agent? If monitoring was completely random, the absence of an investigation would reveal nothing about her ability, and so it would be simple to guarantee truth-telling. It is the fact that no investigation reveals (positive) information on the agent's ability that causes her to be tempted to simply give the consumer what she wants, and hence generates the truth-telling problem.

Truth-telling is a necessary condition for any equilibrium where consumers play an efficient role: otherwise the agent simply allocates $a = 1$ otherwise, in which case exerting effort plays no role. Proposition 2 then immediately follows.

Proposition 2 *Assume that* $V(1,1) = V(1,0) > V(0,0) = V(0,1)$.

1. *If* $2q(e^{**})\Delta \geq 2w_0 - \tilde{\rho}(1,n)[2w_0 - \Delta]$*, then there exists an equilibrium where the agent exerts effort of* e^{**}*, and allocates* $a = \alpha_a$*. In this case, increasing* s *improves social welfare.*

2. *If* $2q(e^{**})\Delta < 2w_0 - \tilde{\rho}(1,n)[2w_0 - \Delta]$*, there is no equilibrium where the agent exerts effort of* e^{**}*, and allocates* $a = \alpha_a$*.*

Proposition 2 illustrates the role of consumers when assets are not priced to consumers. If the truth-telling condition holds, the agent can be induced to allocate the asset honestly, and exerts effort of e^{**}. Because consumers do not identify mistakes which benefit them, effort is lower than in the case in Section 3.1. This represents the first cost of not pricing assets to consumers, but at least results in the agent allocating the asset honestly. If the truth-telling condition holds, more informed consumers increase social welfare, as in Section 3.1. However, if the truth-telling does not hold at an effort level of e^{**}, the agent simply capitulates to the demands of the consumer.

The Role of Consumers Consumers play a more complex role than in the previous section, where more informed consumers always increased welfare. As in Section 3.1, increasing s increases

effort through (13). This has two implications. First, if $2q(e^{**})\Delta \geq 2w_0 - \tilde{\rho}(1,n)[2w_0 - \Delta]$, increasing s increases efficiency for exactly the same reason as in Section 3.1: it focuses investigations, which increases effort incentives. Second, it makes the truth-telling condition more likely because a more informed agent is less worried about an investigation. Holding everything else constant, increases in $e^{**}(s)$ relax the truth-telling condition.[19] These effects yield the outcome that welfare is increasing in s, conditional on truth-telling being satisfied.

But what differs from the previous section is that holding effort fixed, w_0 is increasing in s and since $\tilde{\rho}(1,n)$ is independent of s, this implies that the right hand side of (16) is increasing as consumers become more informed. From this perspective, more informed consumers reduce the likelihood of the truth-telling constraint being satisfied. It is in this sense that more informed consumers can harm allocations, and thus, exacerbate the agency problem. The intuition for this is simple: as consumers become more informed, the information transmitted from not being investigated is more revealing of the agent's talent. In effect, agents feel less threatened by an uninformed consumer. The response to feeling threatened by a consumer is simply to give the consumer what he wants.

In general the effect of more informed consumers is ambiguous: the direct effect is to make truth-telling less likely, but may increase effort by enough to overcome this problem. However, we can still generate some limiting results in Proposition 3, whose proof is in the Appendix, as $s \to 1$ and as $s \to \frac{1}{2}$.

Proposition 3 *Assume that* $V(1,1) = V(1,0) > V(0,0) = V(0,1)$.

1. *For s sufficiently low, there is always an equilibrium where the agent exerts effort of* e^{**}*, and allocates* $a = \alpha_a$.

2. *For s sufficiently high, there is never an equilibrium where the agent exerts effort of* e^{**}*, and allocates* $a = \alpha_a$.

This illustrates the tradeoff with consumer feedback. On the positive side, well informed consumers cause agents to exert more effort, as consumers point out their errors more frequently. But this statement is only true when agents do not fear consumers too much. The negative part of consumer involvement is that when benefits are not priced to consumers, agents become more worried about denying benefits to consumers, because consumers are good at pointing out their errors.

[19] It is also the case that w_0 is increasing in effort also. However, $\frac{dw_0}{de} < \Delta$, so that increasing effort relaxes the truth-telling constraints.

This makes truth-telling more difficult to satisfy, and leads to the temptation to simply capitulate to the desires of the consumer.

4 Outcomes Where Consumers Do Not Induce Effort Exertion

When the truth-telling conditon is violated, there are two possibly optimal pure strategy equilibria, which yield lower utility than when truth-telling holds.[20]

Where the agent reports honestly, but complaints do not affect investigations. First, there always exists an equilibrium where the agent reveals his information truthfully, and complaints never occur. Consider the case where the principal chooses p sufficiently large that the consumer never complains.[21] In that case, he cannot rely on the consumer to point out errors. Instead, the principal believes that the agent is incorrect with probability $1-q(\hat{e})$, where $\hat{e}$ is the expected level of effort in this equilibrium. Accordingly, he chooses a monitoring propensity of $\rho^*(a) = 1 - q(\hat{e})$ as the ex post optimal level of intervention. The utility of the agent is then given by

$$w_0[1-\rho^*(a)] + \Delta q(e)\rho^*(a) - e. \tag{17}$$

The worker then chooses equilibrium effort e_0 to satisfy

$$q'(e_0)\Delta(1-q(e_0)) = 1. \tag{18}$$

This equilibrium has the benefit that the agent exerts effort, but the principal uses none of the information available to the consumer to either improve ex post allocations or improve incentives. Not surprisingly, e_0 is lower than when consumers provide feedback. The equilibrium welfare from this contract is given by

$$\frac{(1-q(e_0))^2}{2} + q(e_0) - e_0 \tag{19}$$

[20] There is also a pure strategy equilibrium where the agent always reports $a = 1$. This also involves effort of $e = 0$. However, the outcome where the agent always offers $a = 1$ is (at least weakly) dominated by either of the other two outcomes. Given the indifference condition described above, this implies that at worst, the principal chooses between the better of the case where (i) the agent reports truthfully, but the consumer never complains, and (ii) the agent always denies the consumer the asset.

[21] There are other cases where complaints do not pinpoint error. For instance, the principal could charge $p = 0$, in which case the consumer always complains, as it focuses attention on the case. But if the consumer always complains, this reveals nothing about whether the agent made an error, so once again there is no role for complaints in inducing effort exertion. See Carmichael, 1988, and Friebel and Raith, 2001, for other work emphaisizing the importance of cutting down communication channels to improve incentives.

Where the Consumer is Always Denied the Asset Second, there is an equilibrium where the agent always reports $a = 0$. This equilibrium involves effort of $e = 0$. To see this, note that for any actual level of effort e, this yields expected utility to the agent of $q(\hat{e})\Delta$, where $\hat{e}$ is the level of effort expected by the principal. But this expected level of effort is independent of the actual level of effort, and so these equilibria always entail $e = \tilde{e} = 0$.

Complaints still can play a role here, and the optimal equilibrium of this form allows the consumer to complain if the allocation is incorrect. Specifically, the principal chooses a price for complaints such that the consumer complains if he believes that $a = 1$ is efficient, but not otherwise. This price is analogous determined to (2), and always exists. With such prices, monitoring propensities are $\tilde{\rho}(0, n) = 1 - s$ and $\tilde{\rho}(0, c) = s$, with resulting utility of

$$\frac{1}{2} + \frac{s^2}{4} + \frac{(1-s)^2}{4} \tag{20}$$

When no equilibrium exists where consumers induce effort exertion, the principal chooses between these two outcomes. The tradeoff is simply between the value of the consumer's information and the agent's. Specifically, there exists a critical value of $q(e_0)$, above which it is optimal to allow the bureaucrat to allocate with no complaints is optimal in this class. The critical value of $q(e_0)$ is, not surprisingly, increasing in s.[22] Also not surprising is that the welfare from these allocations is lower than either the conguity outcome in Proposision 1, nor the equilibrium with divergent preferences when truth-telling holds.

5 Discrete Costs of Effort

To get a sense of possible allocations, consider the case where the effort choice is discrete (0 or 1), where at cost γ the agent can increase the precision of her estimate from $\underline{q}$ to $\overline{q}$. Then consider the optimal allocations that arise.

[22] It is worth pointing out that when preferences are congruent, the outcome where the consumer is always denied is dominated by an allocation mechanism where the consumer chooses the allocation, which is overturned only if the principal finds evidence to the contrary. However, those equilibria never occur when preferences are congruent, but instead only when there are non-congruent preferences. In the case where preferences are non-congruent, the principal is never better off by allowing the consumer to choose the allocation, as he always chooses $a = 1$.

Congruent Preferences First consider the case where $V(1,1) = V(0,0) > V(1,0) = V(0,1)$. Then the agent will exert effort if

$$\frac{w_0}{2}[(1-\rho^*(a,c))(\overline{q}(1-s)+s(1-\overline{q}))+(1-\rho^*(a,n))(\overline{q}s+(1-\overline{q})(1-s))]+ \\ \frac{\Delta}{2}\overline{q}[s\rho^*(a,n)+(1-s)\rho^*(a,c)]-\gamma \geq \\ \frac{w_0}{2}[(1-\rho^*(a,c))(\underline{q}(1-s)+s(1-\underline{q}))+(1-\rho^*(a,n))(\underline{q}s+(1-\underline{q})(1-s))] \\ +\frac{\Delta}{2}\underline{q}[s\rho^*(a,n)+(1-s)\rho^*(a,c)] \quad (21)$$

This defines a critical value of s, say s^*, above which the agent exerts effort and below which the agent chooses $e = 0$. (Of course, s^* may exceed 1.) This is simply the discrete analog of the result above that more informed agents induce (in this case, weakly) more effort. Proposition 4 immediately follows.

Proposition 4 *Assume that $V(1,1) = V(0,0) > V(0,0) = V(1,1)$ and let discrete effort costs be given by γ. Let s^* solve (21) with equality. Then the agent always allocates $a = \alpha_a$ and*

1. *If $s \geq s^*$, the agent can be induced to exert effort.*
2. *If $s < s^*$, the agent does not exerts effort.*

Non-Congruent Preferences Now consider the case where $V(1,1) = V(1,0) > V(0,0) = V(0,1)$. Then the agent will exert effort if

$$\frac{w_0}{2}[(1-\rho^*(0,c))(\overline{q}(1-s)+s(1-\overline{q}))+(1-\rho^*(0,n))(\overline{q}s+(1-\overline{q})(1-s))]+\frac{w_0}{2}(1-\tilde{\rho}(1,n)) \\ +\Delta\frac{\overline{q}}{2}[s\rho^*(0,n)+(1-s)\rho^*(0,c)]+\frac{\overline{q}}{2}\Delta\tilde{\rho}(1,n)-\gamma \geq \\ \frac{w_0}{2}[(1-\rho^*(0,c))(\underline{q}(1-s)+s(1-\underline{q}))+(1-\rho^*(0,n))(\underline{q}s+(1-\underline{q})(1-s))]+\frac{w_0}{2}(1-\tilde{\rho}(1,n)) \\ +\Delta\frac{\underline{q}}{2}[s\rho^*(0,n)+(1-s)\rho^*(0,c)]+\frac{\underline{q}}{2}\Delta\tilde{\rho}(1,n). \quad (22)$$

This defines a critical value s^{**} above which the agent exerts effort and below which the agent chooses $e = 0$. Note that $s^{**} \geq s^*$, because consumers who do not reveal errors in their favor reduce the incentives of the agent to exert effort. The principal partially compensates for this by monitoring more, but since the compensation is only partial, total incentives for the agent fall. This is the first difficulty of providing incentives when consumers have different preferences to those of the principal.

The more subtle problem with the agency relation concerns how consumer knowledge affects the allocation made by the agent after she observes α_a. Next consider the truth-telling constraint when the agent exerts effort. This is given by

$$2\overline{q}\Delta \geq 2\overline{w}_0 - \tilde{\rho}(1,n)[2\overline{w}_0 - \Delta], \tag{23}$$

where $\overline{w}_0$ is the no-investigation wage when the agent exert effort in equilibrium. As w_0 is increasing in s, this implies that there exists a critical value of $\overline{s}$, *below* which the truth-telling condition holds. From the previous section, we know that $\overline{s} < 1$, as the truth-telling condition is always violated when the consumer's information is sufficiently good. Whether the agent can be induced to exert effort and allocate honestly then depends on $\overline{s}$ and s^{**}, as s must exceed s^{**} to induce effort exertion and be below $\overline{s}$ to induce truth-telling.

For values of s below s^{**}, the agent cannot be induced to exert effort. In this case, the truth-telling condition is given by

$$2\underline{q}\Delta \geq 2\underline{w}_0 - \tilde{\rho}(1,n)[2\underline{w}_0 - \Delta], \tag{24}$$

where $\underline{w}_0$ is the no-investigation wage when the agent does not exert effort in equilibrium. This condition is satisfied when s is below some value $\underline{s}$. Note that $\underline{s} < \overline{s}$, as truth-telling is more easily satisfied when the agent exerts effort.

Proposition 5 *Assume that $V(1,1) = V(1,0) > V(0,0) = V(0,1)$ and let discrete effort costs be given by γ. Let s^{**} solve (21) with equality and let $\overline{s}$ ($\underline{s}$) solve (16) for $e = 1(0)$.*

1. *If $s \geq s^{**}$ then,*
   - *If $s^{**} \leq \overline{s}$, the agent can be induced to exert effort and choose $a = \alpha_a$ for s between s^{**} and $\overline{s} < 1$, but there is no equilibrium where she does so for higher values of s.*
   - *If $s^{**} > \overline{s}$, there is no equilibrium where the agent exerts effort, allocates $a = \alpha_a$, and where consumers affect the allocation.*
2. *If $s < s^{**}$ there is no equilibrium with effort exerted and,*
   - *If $s \leq \underline{s}$, the agent allocates $a = \alpha_a$ and the consumer affects the allocation.*
   - *If $s > \underline{s}$, there is no equilibrium where the agent allocates $a = \alpha_a$ and consumers affect the allocation.*

These results simply illustrate the effect that consumers have on the allocation of under-priced goods. It can never be the case that better informed consumers always improve allocations: for s

sufficiently large, consumers can never be used effectively, as agents feel too threatened by them. In that case, either consumer complaints are always ignored, or consumers are always denied the good. Ironically, it is the most informed consumers who are least likely to have their complaints addressed!

6 Conclusion

Agency theory often treats measurement error in a vacuum, where it is unclear how it relates to oversight or to the nature of the goods being allocated. The premise of this paper is that consumers play a central role in resolving agency problems, but do so in complex ways. When the preferences of consumers line up with the preferences of principal, as would often be the case when goods are priced, consumers play a helpful role in allocating goods efficiently, both because the improve ex post allocations and increase ex ante incentives. This part of the paper is, I believe, little more than fleshing out the value of increased information for various forms of oversight.

Consumers play a more ambiguous role when their preferences differ from those of the principal. Here agents worry about complaints made by well-informed consumers and become tempted to simply give them benefits, even when they do not believe that these benefits are warranted. By doing so, they avoid complaints which could reveal error, and hence, penalty. Even in the case where these truth-telling problems can be overcome, it remains the case that oversight is less effective than with congruent preferences, as they point out fewer ex post errors which both harm ex post allocations and ex ante incentives. Thus, the nature of goods allocated affects the efficiency of their allocation, through the actions of the consumers that benefit from their allocations.

This implies that agency problems are partly caused by the nature of the goods allocated, which generates the congruity described above. One important dimension is whether consumers pay for their allocations. In situations where benefits are not priced, consumers generally prefer to receive the benefit, even when it is not warranted. For instance, patients prefer their insurance companies to approve them for health care, applicants always want to be approved for unemployment benefits, students want higher grades, suspects prefer not to be arrested, and so on. I argue that it is particularly difficult to resolve agency problems for these goods because consumer feedback is less reliable than when the consumer and principal agree on desired outcomes. Note also that many of these goods are allocated through the public sector (police forces, benefit officers, health care in many countries, etc.) so that this paper offers an explanation for the supposed inefficiency of these institutions.

Appendix: Proofs of Results

Proof of Proposition 3:
Consider the case where consumers are completely uninformed, $s \to \frac{1}{2}$. In that case, $w_0 \to \Delta q$, as there is no information transmitted by not investigating and the truth-telling condition becomes

$$2q(e) \geq 2q(e) - (1 - q(e))(1 - 2q(e)) \tag{25}$$

which is satisfied for $\frac{1}{2} > q > 1$. Therefore, when consumer are poorly informed of the optimal allocation, the agent worries little about the prospect of a complaint.

On the other hand, when $s \to 1$, then $w_0 \to \Delta \frac{1+q}{2}$, and the truth-telling condition becomes

$$2q(e) \geq 1 + q(e)^2, \tag{26}$$

which is always violated for $q < 1$. Thus, the agent can never be induced to report honestly if the principal monitors (ex post) efficiently and consumers are very well informed.

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