How often should you open the door?

Optimal monitoring to screen heterogeneous agents

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October 7, 2003

Abstract

This paper shows that monitoring too much a partner in the initial phase of a relationship may not be optimal if the goal is to determine her loyalty to the match and if the cost of ending the relationship increases over time. The intuition is simple: by monitoring too much we learn less on how the partner will behave when she is not monitored. Only by giving to the partner the possibility to mis-behave she might be tempted to do it, and only in this case there is a chance to learn her type at a time where separation would be possible at a relatively low cost.

JEL-Code: D2, D8, M5
Keywords: Monitoring, probation, effort, asymmetric information

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We are very grateful to Heski Bar-Isaac, Winand Emons, Eberhard Feess, Simon Lörtscher Massimo Motta, Andreas Roider and Klaus Schmidt for helpful comments and discussions. The second author gratefully acknowledges financial support from the Department of Economics at the European University Institute through a Jean Monnet Fellowship.

1 Introduction

The need to test the reliability of potential partners at the beginning of a long term project is a typical feature of many human relationships, not only of an economic nature. This need is particularly strong in the frequent cases in which, once the project starts, a separation from unreliable partners becomes more difficult. It is therefore not surprising that many partnerships feature, either explicitly or implicitly, an initial period of "probation" in which the persons involved monitor each others and decide, before it is "too late", whether to go on with the relationship or not. What is perhaps more surprising is that monitoring partners permanently during these probation periods may not be optimal, and in this paper we want to show why.

The intuition is simple. Consider an engagement before marriage in which the women wants to test the loyalty of the potential husband (or vice versa if you prefer). A simplification not too far from reality is to assume that there are two types of men: those who will never betray their partner and those who instead might fall to the temptation of a love affair if an attractive occasion materializes. In order to find out to which type of men the potential husband belongs, the *fiancee* might try to spend with him as much time as possible, monitoring him closely in all his daily and night activities. In this way she would apparently learn a lot about him, but effectively she would not learn the most important thing to be learned, which is how the potential husband behaves when, as during marriage, he is not monitored permanently. Only by giving to the partner the possibility to mis-behave he might be tempted to do it, and only in this case his type could possibly be revealed when splitting would still be feasible at low cost.

A similar situation characterizes labor market contracts where probation-

ary periods are often specified explicitly. Note that the distinctive feature of these periods is not to make monitoring possible, but to be periods in which firing is allowed at a relatively low cost. Even when probation is not explicitly foreseen in a contract, various reasons (e.g. sunk costs or investments in job specific human capital) make it easier to fire a worker earlier in a career than later. In all these cases we argue that too much monitoring at the beginning of the contract is not optimal, because it prevents the firm from learning how the worker behaves when she is not monitored. As in the case of the engagement before a marriage, the firm is typically interested in discriminating between two types of potential employees: those who are "unconditional cooperators", and therefore exert a maximum level of effort in all instances, and those who are instead "rational shirkers", and would therefore indulge in laziness if the cost of effort is high and the probability of detection sufficiently low. Inasmuch as the "rational shirkers" can mimic the behavior of the "unconditional cooperators" during probation, permanent monitoring ("keeping the office door always open") is suboptimal because the probability of detection would be too high and the "rational shirker" would never concede to the temptation of being "lazy". As a result the two types of workers would be observationally identical during probation, and only when firing becomes costly the true types would be revealed. On the contrary, random monitoring ("opening the door not too often and with no specific pattern") might be more revealing because the "rational shirker" would be induced to take a chance to be lazy. Thus, only in this case there would be a chance that the two types of workers might be caught behaving differently.

Also in the case of trading between firms, and in general between "buyers" and "sellers", the same type of result might apply. Most firms write long term contracts with other firms to obtain inputs for their production process. The

selection of partners for the provision of inputs may be subject to a trial period similar to the one that characterizes labor or marriage contracts. What this paper suggests is that these periods would be totally uninformative on the reliability of the trading partners if the buyer announced the willingness to monitor extensively the quality of the input acquired during trial. If the unreliable sellers knew that they would be fully monitored during trial, they would try to make their product indistinguishable from the product of reliable sellers. However, this would offer no guarantee that the product would be of high quality after the long term contract is signed.

So our intuition is in principle relevant for many kinds of human relationships, but of course not for all of them. Thus, in the light of the above examples and before going into a formal description of our model in Section 3, it may be useful to clarify, within a generic "principal-agent" framework, what is needed for our intuition to apply. We will do this in the next section at the end of which it will be evident that the set of relevant cases is quite large.

2 The necessary ingredients

First, there must be heterogeneity of agents with respect the cost of exerting effort, an hypothesis which probably characterizes most human relationships and which is for example strongly supported by the evidence described in Nagin, Rebitzer, Sanders, and Taylor (2002) and Ichino and Riphahn (2003).[1]

[1] The first paper analyzes data from a field experiment in which the monitoring rate is varied to see how people react to it in terms of shirking. It finds that, although there are many "rational shirkers", a significant proportion of agents does not take advantage when the monitoring rate goes down and can thus be classified as "unconditional cooperators". The second one compares the absenteeism rate of newly hired workers during and after probation in a large Italian bank. 42% of them are never absent while among the others an increase in absenteeism is observed on average when incentives change at the end of probation.

Without loss of generality, we distinguish between "good" agents who are willing to exert effort unconditionally and "bad" agents who instead face effort costs and therefore are potential shirkers. Since a shirking agent yields a negative payoff to the principal, the latter is interested in identifying bad agents in order to stop the relationship with them.

Second, splitting from an agent must become more costly for the principal as the length of the relationship increases. Although this assumption restricts somewhat the set of relevant cases, it captures a feature that often characterizes long term relationships. This feature is sometimes a consequence of institutional arrangement, like engagements in the marriage market and probation periods in the labor markets, but the existence of such an explicit reference to a trial period is not necessary for our story. Splitting may become increasingly difficult also because of sunk costs paid at some point during the relationship or because of the accumulation of match specific capital that would be too costly to destroy in case of splitting. For any of the above reasons, the principal is interested in identifying bad agents as soon as possible, in order not to remain stuck with them when firing becomes too expensive. On the other hand, for the same reasons, bad agents have an extremely strong incentive to mimic good agents, because when firing becomes too costly for the principal they can shirk at no risk.

Third, we consider only situations in which it is either impossible or too costly to design menus of contracts capable to "screen" between the two types of workers. Once again, this should not appear as a particularly restrictive assumption, since in any realistic setup, the number of different contracts which can be offered by a principal is "finite", so that there might still exist some degree of heterogeneity among agents who choose a particular contract. In the extreme case frequently encountered in real-world labor markets, there

are institutional constraints such that workers who do the same job must also get the same (fixed) wage. This is the case we consider but our results do not qualitatively change as long as the type space is "richer" than the space of potential contracts to offer so that there is heterogeneity for each different type of contract. Moreover, our setting implies that bad types have a strong incentive to mimic good types, since they would otherwise be fired when choosing the contract designed for them. Thus, such screening contracts either do not exist, or even if they do, it would be relatively expensive for the principal to use them, because of the significant rents to be offered to agents to satisfy the incentive and the participation constraints. After all, the fact that probation periods exist in many long term relationships of different nature indicates that it is not so easy to define menus of contracts capable to implement an efficient screening of workers.

Fourth, the monitoring of agents must be possible and thus constitute a feasible means to identify bad agents. Upon using the monitoring device, the principal can observe the effort decision of an agent in a way such that the effort choice becomes in fact "observable" although it remains "non-verifiable" in court. Thus a contract cannot condition on it. However, during the probation period, splitting is possible (or has lower cost) precisely in the sense that there is no need to verify misbehavior in court in order to end the relationship.

Whenever, these four conditions are met, the principal faces a trade off when deciding on the optimal monitoring policy during the probation period. On the one hand, more monitoring is good because it increases effort incentives in the probation period. On the other hand, there is a countervailing effect since more monitoring also induces more bad types to exert effort in the probation period so that they cannot be identified. As explained above,

our main result is that even if monitoring is costless, there is an incentive to choose a relatively small monitoring frequency, in order to induce some of the bad types to shirk in the probation period. Note that assuming monitoring to be costless makes our point particularly stark, as, with monitoring costs, the optimal monitoring rate would be even less. Thus, our result is qualitatively different from the literature on law enforcement building on Becker (1968) in which the fact that optimal detection probabilities are typically less than one is driven by the presence of enforcement costs (see e.g. Polinsky and Shavell (2000)).

In the Personnel Economics literature, probation is often rationalized as an institution aimed at screening workers in the presence of unobservable worker productivity (see e.g. Guasch and Weiss (1981), Sadanand, Sadanand, and Marks (1989), and Bull and Tedeschi (1989)), but we are not aware of a literature signaling the existence of the above-mentioned trade-off and studying its implications. An exception is represented by Wang and Weiss (1998) who analyze in a more general setting the possibility to use random tests to screen workers during probation in combination with wage schedules which differ according to the outcome of the test. By highlighting this combination of tools, they show that "excessive monitoring" can deter low productivity workers from applying for jobs, thereby making the pool of applicants endogenous. Contrary to that, our story would apply whenever there is some residual heterogeneity, e.g. concerning the propensity towards shirking, *after* agents have been hired. Note that the two stories together suggest the possibility that the firm's ex ante commitment to excessive monitoring in order to deter bad applicants may be time inconsistent when the screening process is not perfect and the firm hires bad workers in equilibrium.[2]

[2]The importance of commitment power is also stressed in the literature on law en-

The rest of this paper is devoted to analyze formally what so far we have described intuitively.

3 The Model

In our model, there is one principal and $N \geq 1$ ex ante identical agents. Production takes place in two periods $i = P, A$, a probation period P and a period after probation is finished denoted by A. In each period, agents can choose an action from $\{E, S\}$ where E and S denote "exerting effort" and "shirking", respectively. A shirking agent yields 0 to the principal, while when exerting effort, each agents yields the principal a payoff of v_i in period i. We assume $v_P < v_A$ such that an agent is more productive when he is more experienced.

Although all agents are equally productive when exerting effort, they differ with respect to the (privately known) cost of doing so which is represented by a parameter $\theta \in \{G, B\}$: "bad types (B)" have effort costs c in each period, which is drawn from a distribution $H(c) \in C^1$ with support [0,1] at the beginning of the game. On the other hand, "good types", denoted by G do not face any costs of exerting effort.[3] In the population of agents, the share of good and bad types is α and $(1-\alpha)$, respectively, where $0 < \alpha < 1$. Concerning the informational environment, we assume that each agent privately learns his type at the beginning of the game and that α and $H(\cdot)$ are common knowledge. As for payments, denote by t_i the transfer from the

forcement and auditing where the problem of time inconsistency is also prevalent (see e.g. Kaplow and Shavell (1994)). See Khalil (1997) for a model in which the principal cannot commit in advance to a monitoring rate.

[3] As explained in the Introduction, this view is e.g. broadly confirmed in a field experiment reported in Nagin, Rebitzer, Sanders, and Taylor (2002). Alternatively, we could assume that good types face effort costs which are lower on average than those of bad types. This would not change our arguments qualitatively.

principal to the each agent which accrues at the beginning period i as long as the relationship is not terminated. Thus, there is no way in which the principal can use t_i to discriminate among types. Concerning the parameter values, we make the following assumption:

Assumption 1. $v_A > t_A > 1 > v_P > t_P > 0$

Assumption 1 implies i) that the payoff for the principal from each agent when exerting effort is positive in both periods ($v_A > t_A$ and $v_P > t_P$), ii) in period A, exerting effort is always (i.e. for any realization of c) socially efficient and also privately optimal for an agent when he is monitored with certainty ($v_A > 1$ and $t_A > 1$), iii) in period P, the productivity of an agent is not too high ($v_P < 1$).

Period P is a probation period in which the principal can monitor each agent at no cost. His choice variable is thus a probability $q \in [0, 1]$. The outcome of the monitoring process is captured by a variable $M \in \{E, S\}$ which perfectly reveals when shirking has occurred. After observing the outcome of the monitoring process and updating his beliefs appropriately by use of Bayes' rule, the principal makes a firing decision $F \in \{0, 1\}$, where $F = 1$ means that an agent is fired. Firing costs in the trial period are zero, while in the second period they are prohibitively high. It is assumed that the population out of which the N agents are drawn is sufficiently large such that, upon monitoring one agent, no inference can be made about the pool composition of the remaining $N - 1$ agents. Throughout, we want the principal to wish to continue with an agent when his belief after the monitoring process is greater or equal to the prior α.[4] This will imply that the following assumption must hold:

[4]We can alternatively assume that an agent cannot be fired without being monitored. This would e.g. be consistent with legal practice in the US, see Krueger (1991).

Assumption 2. $\alpha \cdot (v_A - t_A) + (1 - \alpha) \cdot (-t_A) > 0$

Summarizing, the game has the following 4 stages:

- At stage 1, the principal sets and commits to a monitoring probability q for the probation period.
- At stage 2 each agent independently decides on whether or not to exert effort. After the effort choice is made, each agent is monitored with probability q.
- At stage 3, given the outcome of the monitoring procedure, the principal decides on which agents to fire. After the firing decision period P ends.
- At stage 4, in period A, all remaining agents again decide on whether or not to exert effort. Then the game ends.

3.1 Equilibrium Behavior of the Agents

Let us start the analysis of the game at stage 4, and denote by $a_i^\theta \in \{E, S\}$ the action chosen by type $\theta \in \{B, G\}$ in period $i = P, A$. Equilibrium values carry an asterisk *. We start with a good type: Since he has no effort costs, he is indifferent between exerting effort and shirking (both actions yield a payoff of t_A). Throughout we assume that both types exert effort when indifferent, so that good types will always choose $a_A^{G*} = E$ in period A.[5] Contrary to that, in period A, a bad type gets $(t_A - c)$ from choosing E and t_A from choosing S so that bad types will always shirk in period A, i.e. $a_A^{B*}(c) \equiv S \ \forall c$.

Let us now look at the principal's optimal firing decision at stage 3 after monitoring has been carried out. Denote by $\beta \in [0, 1]$ the belief of facing a

[5] All we need is that the expected payoff for the principal in period A from having a good (bad) type is positive (negative).

good type conditional on the outcome of the monitoring process:

$$\beta := Pr(\theta = G \mid M) \tag{1}$$

Of course, in (a Bayesian perfect) equilibrium, whenever possible, this has to be consistently derived using Bayes' rule from the equilibrium strategies of each type of agent at stage 2 (see e.g. Fudenberg and Tirole (1991). Given that good types will exert effort while bad types will always shirk in period A, the principal's expected payoff from an agent for period A as a function of β is given by

$$\beta(v_A - t_A) + (1 - \beta)(-t_A) \tag{2}$$

which may be positive or negative. It follows that the principal will fire an agent, whenever monitoring "delivers" the belief for this agent to be a good type is sufficiently low:

$$F^*(\beta) = \begin{cases} 1 & \text{if } \beta < \frac{t_A}{v_A} \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

Now consider the optimal effort decision at stage 2 by each type for a given probability of monitoring q: In doing so, we directly look at the following equilibrium continuation and then see how it can be supported:

Lemma 1. *At stage 2, for all $q < \overline{q} := \frac{1}{t_A}$, there exists a unique equilibrium continuation in which*

a) each good type chooses $a_P^{G*} = E$ independent of q,

b) each bad types shirks whenever his realization of c is sufficiently high. This happens with probability $(1 - e(q)) > 0$,[6]

c) the detection of shirking leads to the following beliefs

$$\beta^* = Pr(\theta = G \mid M = E) = \frac{\alpha}{\alpha + (1 - \alpha)e(q)} > \alpha \tag{4}$$

$$\beta^* = Pr(\theta = G \mid M = S) = 0 \tag{5}$$

[6]The exact definition of $e(q)$ is given in Eqn. 9 below.

and the principal optimally fires all agents for which $M = S$ holds and thus keeps all other agents (including those who have not been monitored).

For an intuition for Lemma 1, let us start with a good type: On the equilibrium path, when choosing E, he gets t_P in period P, and t_A in period A: if he is monitored, this will lead to $M = E$ and so the principal holds the belief $\beta^* = \frac{\alpha}{\alpha+(1-\alpha)e(q)} > \alpha$ for which, by Assumption 2, $F = 0$ is optimal. If he is not monitored, the principal holds belief $\beta^* = \alpha$ and he is not fired either. On the other hand, when choosing S in the first period, his payoff is still t_P (since he does not save in effort costs, but with probability q, he is monitored, detected of shirking and, given belief $\beta^* = Pr(\theta = G \mid M = S) = 0$, fired. It follows that his expected payoff for period A is only $(1-q)t_A$ and thus, a deviation is never profitable.

Now consider a bad type: When choosing E, he gets $(t_P - c)$ in period P. When monitoring occurs, he is taken to be a good type and thus will also get t_A in period A in which he will then shirk, so that he will not again incur effort costs c in that period. On the other hand, when choosing S, he gets t_P in period P (thus saving on effort costs c), but with probability q he is detected of shirking and fired, so that his expected payoff for period A is only $(1-q)t_A$. It follows that S is preferred iff

$$t_P - c + t_A < t_P + (1-q)t_A \Leftrightarrow c > qt_A \tag{6}$$

so that the optimal decision of a bad type as a function of q and c is given by

$$a_P^{B*}(q,c) = \begin{cases} S & \text{if } c > qt_A \\ E & \text{otherwise} \end{cases} \tag{7}$$

i.e. shirking occurs whenever effort cost are sufficiently high. This means that for $q \geq \overline{q} := \frac{1}{t_A}$, all bad types choose E independent of their cost parameter c. Thus, shirking would no longer occur on the equilibrium path so that there

would be no information transmission and $\beta^* = Pr(\theta = G \mid M = S) = \alpha$ would hold, allowing for a plethora of pooling equilibria, since Bayes' rule would have no bite in case of $M = S$. However, we will show below that it is indeed optimal for the principal to choose some $q < \overline{q}$ so that both possible actions, E and S, occur with positive probability on the equilibrium path. Therefore, there is no leeway in forming off-equilibrium beliefs and so this equilibrium continuation is indeed unique.[7] Finally, note that the principal's belief conditional on M is consistent with the equilibrium strategies of both types.

3.2 The Principal's Optimal Choice of q

It remains to determine the optimal choice of q at stage 1, under the assumption that the equilibrium continuation as derived in Lemma 1 is played subsequently. Clearly, the principal's objective is to maximize expected payoff. Let us analyze each part of it in turn:

Good Types: In period P, there are $\alpha \cdot N$ good types, none of them shirks in equilibrium and so each of them yields payoff $(v_P - t_P) > 0$ to the principal. Consequently, none of them is fired and, in period A, there is again no shirking and each of $\alpha \cdot N$ good types yields the principal $(v_A - t_A) > 0$. It follows that the choice of q neither influences the number of good types in each period nor their choice of effort. Therefore, in what follows we can neglect the good types as they will have no effect on the optimal level of q.

Bad Types: Recall that a bad type will shirk in period P whenever $c > qt_A$. Thus, from the principal's point of view, the respective probabilities for

[7] We confine attention to pure strategy equilibria.

shirking and exerting effort, respectively, are given by

$$s(q) := Pr(c > qt_A) = \max(0, 1 - G(qt_A)) \quad (8)$$

$$e(q) := Pr(c \leq qt_A) = \min(G(qt_A), 1) \quad (9)$$

Clearly we have $\frac{ds}{dq} \leq 0$ and $\frac{de}{dq} \geq 0$ and $s'(q) = -e'(q)$.

Since there are $(1 - \alpha) \cdot N$ bad types, the expected payoff generated by them in period P is:

$$\pi_P(q) := (1 - \alpha) \cdot N \cdot (e(q) \cdot (v_P - t_P) + s(q) \cdot (-t_P)) \quad (10)$$

Note that this term is increasing in q since more monitoring leads to less shirking and this increases the expected payoff of the principal.

As for period A, however, there is a countervailing effect, as q also influences the number of bad types in period A. In particular, when q is high, then each bad agent is less likely to shirk in period P (recall that $\frac{ds}{dq} \leq 0$) and thus cannot be identified through monitoring. As bad types shirk with probability 1 in period A, thus generating a negative payoff to the principal, too much monitoring is not in the principal's interest.

Formally, the number of bad types in period A can be determined as follows: Each bad types shirks with probability $s(q)$ but gets detected only with probability q so that $(1-\alpha) \cdot N \cdot (1-q) \cdot s(q)$ bad types remain in period A. Moreover, each bad type exerts effort with probability $e(q)$ and is thus not identified through monitoring so that another $(1 - \alpha) \cdot N \cdot e(q)$ survive the probation period. Taking this together, since each bad types generates a payoff of $(-t_A)$ to the principal, his expected payoff from the bad types in period A is given by

$$\pi_A(q) := (1 - \alpha) \cdot N \cdot ((1 - q) \cdot s(q) + e(q)) \cdot (-t_A) \quad (11)$$

Taking these effects together, we can state the following result concerning the optimal monitoring frequency q^*:

Proposition 1. *Given equilibrium continuation 1, the monitoring probability q^* which maximizes the expected payoff of the principal is strictly smaller than $\overline{q}$ and therefore implicitly given by $\frac{d}{dq}(\pi_P(q^*) + \pi_A(q^*)) = 0$.*

Proof. We proceed along the following lines: Since the objective function of the principal is well-behaved (i.e. strictly concave) in the interval $[0, \overline{q})$ where $\overline{q} := \frac{1}{t_A}$,
i) we show that the expected payoff of the principal is strictly increasing at $q = 0$ and strictly decreasing as $q \to \overline{q}$
ii) we show that also the absolute expected profit level is higher at $q = q^*$ than at $q = 0$ and when q approaches $\overline{q}$ (the payoff function of the principal is flat for all $q > \overline{q}$)
To do this, define

$$\begin{aligned} X(q) &:= e(q)(v_P - t_P) + s(q)(-t_P) + [(1-q)s(q) + e(q)](-t_A) \\ &= e(q)v_P - (t_P + t_A) + qt_A(1 - e(q)) \end{aligned} \tag{12}$$

where in the second line, we use the fact that $e(q) \equiv 1 - s(q)$. Note that for the expected payoff of the principal from the bad agents, we then have $\pi_P + \pi_A = (1-\alpha) \cdot N \cdot X(q)$ so that q^* is uniquely determined by $X(q)$, since we have seen before that a good type's equilibrium decision is independent of q.

ad i): We need to show that $X'(q = 0) > 0$ and $X'(q \to \frac{1}{t_A}) < 0$:

$$X'(q = 0) = e'(0) \cdot v_P + t_A > 0 \tag{13}$$

since $e'(\cdot) \geq 0$. Moreover,

$$X'(q \to \frac{1}{t_A}) = e'(\frac{1}{t_A}) \cdot v_P + t_A \cdot [\frac{1}{t_A}(-e'(\frac{1}{t_A})) + (1 - e(\frac{1}{t_A}))] \tag{14}$$

$$= e'(\frac{1}{t_A}) \cdot (v_P - 1) < 0 \tag{15}$$

which is true due to Assumption 1.

ad ii): Note that we have

$$X(0) = e(0)v_P - (t_P + t_A) \tag{16}$$

$$X(\frac{1}{t_A}) = v_P - (t_P + t_A) \tag{17}$$

$$X(q^*) = e(q^*)v_P - (t_P + t_A) + q^* t_A \cdot (1 - e(q^*)) \tag{18}$$

For the comparison of $X(0)$ and $X(q^*)$ we have:

$$X(q^*) - X(0) = e(q^*)v_P + q^* t_A \cdot (1 - e(q^*)) > 0 \tag{19}$$

For the comparison of $X(\frac{1}{t_A})$ and $X(q^*)$ we have:

$$X(q^*) - X(\frac{1}{t_A}) = (e(q^*) - 1)v_P + q^* t_A \cdot (1 - e(q^*))$$

$$= (1 - e(q^*))(q^* t_A - v_P) \tag{20}$$

Clearly, this expression is positive if $(q^* t_A - v_P) > 0$ which is equivalent to $q^* > \frac{v_P}{t_A}$. That this must be true follows from the fact that $X(\cdot)$ is strictly increasing at $q = \frac{v_P}{t_A}$:

$$X'(q = \frac{v_P}{t_A}) = e'(\frac{v_P}{t_A}) + t_A \cdot [\frac{v_P}{t_A}(-e'(\frac{v_P}{t_A}) + (1 - e(\frac{v_P}{t_A}))]$$

$$= t_A \cdot (1 - e(\frac{v_P}{t_A})) > 0 \tag{21}$$

since $\frac{v_P}{t_A} \ll \frac{1}{t_A}$ by Assumption 1. □

Intuitively, although monitoring is costless, there is an incentive not to set the monitoring frequency too high as this would induce less bad types to shirk

in period P so that they cannot be filtered out. Moreover and also intuitively clear, this is true only the value of an agent in the first period, v_P, is not too high (i.e. less than one, see Assumption 1). Otherwise, the objective of filtering out the bad types is dominated by the objective to induce as much effort as possible in period P. Finally, given q^*, the behavior determined in the equilibrium continuation (see Lemma 1) is also optimal and so Lemma 1 together with Proposition 1 characterize indeed the unique equilibrium of this game.

4 Conclusions and Extensions

We have shown in this paper that monitoring too much a partner in the initial phase of a relationship may not be optimal if the goal is to determine her loyalty to the match and if the cost of terminating the relationship increases over time. If too much monitoring induces the partner to behave well even if her inclination in the absence of monitoring would be to mis-behave, the principal does not learn what needs to be learned at the beginning of a relationship. Note that this mechanism is completely independent of the costs of monitoring, and thus the result holds even if monitoring is costless.

This general intuition applies to many long term social relationships characterized by asymmetric information with respect to the types of agents, like for example, labor and marriage contracts.

Although at this stage our paper has essentially a normative flavor, in terms of positive analysis it suggests that relationships in which too much monitoring takes place at the beginning should perform worse at later stages of their development. In particular, everything else equal, a larger fraction of less loyal agents, or a higher probability of not loyal behavior from a single agent, should emerge in the long run when the principal monitors agents too

much at the beginning. What comes next in our research agenda is to explore the possibility of providing empirical evidence on this testable prediction of our model.

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