Ripoffs, Lemons, and Reputation Formation in Agency Relationships: A Laboratory Market Study: Discussion
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studied, agents were able to use opportunities for false advertising to their advantage and "ripoff" principals.

Given the evidence provided in this study, we may now begin to examine some of the remedies proposed for dealing with the effects of moral hazard. In DeJong et al. [3], we have examined the impact of a negligence liability rule on these environments where agents could, for a cost, investigate and perfectly determine an agent's actions if a loss occurred. If the agent delivered a "lemon," the agent was held liable for the loss. We found that this liability rule almost completely eliminated the adverse effects of moral hazard as long as the outcomes from all investigations were publicly announced. In a future study, we plan to construct a set of laboratory markets to examine the effect of risk-sharing incentive contracts on the moral hazard problem.

REFERENCES

1. K. J. Arrow. *Essays in the Theory of Risk-Bearing.* Markham, Chicago, 1971.
2. R. Cooper and T. W. Ross. "Prices, Product Qualities and Asymmetric Information: The Competitive Case." *Review of Economic Studies* 51 (April 1984), 197–207.
3. D. V. DeJong, R. Forsythe, R. J. Lundholm, and W. C. Uecker. "A Laboratory Investigation of the Moral Hazard Problem in Agency Relationships." Institute of Accounting Research Working Paper 8407, University of Iowa, December 1984.
4. D. V. DeJong, R. Forsythe, and W. C. Uecker. "The Methodology of Laboratory Markets and Its Implications for Agency Research in Accounting and Auditing." *Journal of Accounting Research* (Autumn 1985), forthcoming.
5. B. Klein and K. B. Leffler. "The Role of Market Forces in Assuring Contractual Performance." *Journal of Political Economy* 89 (August 1981), 615–41.
6. D. M. Kreps, P. Milgrom, J. Roberts, and R. Wilson. "Rational Cooperation in the Finitely Repeated Prisoners' Dilemma." *Journal of Economic Theory* 17 (August 1982), 245–52.
7. M. Lynch, R. M. Miller, C. R. Plott, and R. Porter. "Product Quality, Information Efficiency and Regulations in Experimental Markets." Unpublished manuscript, 1984.
8. R. Selten. "The Chain-Store Paradox." *Theory and Decision* 9 (April 1978), 127–59.
9. S. Shavell. "Risk Sharing and Incentives in the Principal and Agent Relationship." *Bell Journal of Economics* 10 (Spring 1979), 55–73.

DISCUSSION

HAIM MENDELSON*: This paper studies a laboratory market where an agent is paid by a principal to provide a service of unknown quality. It is useful to place this model in the context of studies on markets with quality variation: the quality variation may be either exogenous or *endogenous*; the setting may be single-period, *finite-multiperiod*, or infinite-period; quality may be set once and for all (in the first period) or *adjusted dynamically*; and the market structure may range between monopolistic and *competitive* [the *italics* identify the specific choices made by DeJong, Forsythe, and Lundholm (DFL)]. Clearly, the above suggests a number of alternative settings for future research and for interesting comparisons; for example, if quality is set once-and-for-all, we obtain a clear rationale for reputation formation—how will this effect be reflected in laboratory results?

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The paper presents interesting results which are examined in light of the predictions of two static models: a "lemons" model and a "ripoffs" model. The results indicate that the "ripoffs" model outperforms the "lemons" model, and furthermore there is evidence for more cooperative behavior than that predicted by the "ripoffs" model, namely, there are reputation effects. The authors allude to the results of Kreps, Milgrom, Roberts, and Wilson which, as they correctly argue, are difficult to operationalize in the current setting; clearly, the analysis would benefit from the guidance of an explicit multiperiod model. In the following section, I suggest an approach to modeling the problem at hand.

Another comment relates to the experimental design. Here, losses were sampled *without* replacement (over sequences of 10 deliveries for each service type) to provide "further control over the parameters of the laboratory market" (footnote 2). However, this changes the loss probabilities as a function of the history of the process. Thus, for example, if no loss has occurred in a sequence of nine type 5 deliveries (in set I experiments), the tenth type 5 delivery would actually have the *lowest* possibly quality rather than the highest! Similar anomalies, which confound the experimental outcomes, are direct consequences of the sampling without replacement procedure. DFL suggest that they have essentially "fooled" the subjects by not informing them of this procedure; however, rational subjects may make inferences from the experimental outcomes, and are particularly likely to do so when the instructions are somewhat vague. Further, there are long-run "reputation" effects which suggest that a preferable alternative may be to sample losses independently and clearly explain the implications of this independence to subjects (e.g., through appropriate "practice calculations").

A different comment relates to the market structure (which is presumed to be competitive). I am not sure that three agents are sufficient to achieve competitive results, especially due to the fact that quality variations segment the market. In particular, assume that one of the three agents has built a reputation for high quality, and the remaining two have not—is the reputable agent directly competing with the remaining two? Is the market for the high-quality service competitive? This issue will also be alluded to in the "reputation" modeling approach suggested below.

I. A "Reputation" Modeling Approach

This section outlines a simple approach to the modeling of "reputation" effects in a multiperiod finite-horizon context. Assume (for brevity) that there are two levels of quality, 1 and 2, with loss probabilities q_1 and q_2 and servicing costs c_1 and c_2, respectively ($q_1 > q_2$, $c_1 < c_2$). An agent is either "reputable" ("R") or notorious ("N"). Assume for simplicity that failures are publicly disclosed and a seller is "R" if his service never led to a loss, and becomes "N" on his first failure. Let M be the total number of agents; K the total number of market periods; k the number of market periods remaining until the end of the horizon ($k = 1, 2, \cdots, K$); m the number of "R" agents currently in the market; and $P_R^k(m)$ [$P_N^k(m)$, respectively] the price charged by an "R" ("N") agent when there are m "R" agents, and k periods remain until the end of the horizon. The functions $P_R^k(m)$

and $P_N^k(m)$ depend on the assumed market structure. Let $V_R^k(m)$ $[V_N^k(m)]$ denote the expected total profit of an "R" ("N", respectively) agent over the k remaining periods, and let α_R^k (α_N^k) denote the probability that an "R" ("N") agent will provide service level 1. Then, the usual dynamic programming formulation leads to the following equations for period k $(k > 0)$:

$$V_N^k(m) = P_N^k(m) - c_1 + \sum_{j=0}^{m} \binom{m}{j} \cdot [(\alpha_R^k \cdot q_1 + (1 - \alpha_R^k) \cdot q_2]^j \cdot [\alpha_R^k(1 - q_1) + (1 - \alpha_R^k)(1 - q_2)]^{m-j} \cdot V_N^{k-1}(m - j) \tag{1}$$

and

$$\begin{aligned} V_R^k(m) = \max_{0 \le \alpha \le 1} \{ & P_R^k(m) - \alpha c_1 - (1 - \alpha)c_2 + [\alpha q_1 + (1 - \alpha)q_2] \\ & \cdot \sum_{j=0}^{m-1} \binom{m-1}{j} [\alpha_R^k q_1 + (1 - \alpha_R^k)q_2]^j [\alpha_R^k(1 - q_1) \\ & + (1 - \alpha_R^k)(1 - q_2)]^{m-1-j} \\ & \cdot V_N^{k-1}(m - 1 - j) + [\alpha(1 - q_1) + (1 - \alpha)(1 - q_2)] \\ & \cdot \sum_{j=0}^{m-1} \binom{m-1}{j} [\alpha_R^k q_1 + (1 - \alpha_R^k)q_2]^j \\ & \cdot [\alpha_R^k(1 - q_1) + (1 - \alpha_R^k)(1 - q_2)]^{m-1-j} \\ & \cdot V_R^{k-1}(m - j) \}, \end{aligned} \tag{2}$$

where, in a symmetric equilibrium, $\alpha = \alpha_R^k$, and we have assumed $\alpha_N^k = 1$. We can add a constraint such as DFL's (2) (i.e., principals are not driven out); a special form of (1), (2) is required when $k = 0$. Note that, by (2), the tradeoff faced by the reputable agent is between immediate "ripoff" gains [since he will be able to sell at the "reputable" price $P_R^k(m)$, while his cost will be only c_1] and the increased probability of becoming "N", thus reducing his future gains. Intuitively, this tradeoff should favor the future increasingly as k increases; for example, in the last period there is no future and reputation has no value. Also, note that the inductive argument of the "chain store paradox" does not apply here.

The above approach allows us to make alternative assumptions regarding the market structure. Assume, for example, that each segment (the "R" agents and the "N" agents) operates as a Bertrand oligopoly; then, the "R" price will be competitive as long as $m \ge 2$, and monopolistic when $m = 1$. Similarly, the "N" price will be competitive when $m \le M - 1$ and monopolistic when $m = M - 1$. The two prices must be related by

$$P_R^k(m) - P_N^k(m) = (\alpha_N^k - \alpha_R^k)(q_1 - q_2)l$$

whenever $1 \leq m < M$ (i.e., two types of agents exist). Note that, in this type of model, reputation effects are related to market power, since an "R" firm may hope to become a monopoly in the "R" market segment.

Model builders often argue that models provide valuable guidance for empirical (and experimental) research; a good example arises here. Since DFL do not use a multiperiod model, it is not surprising that they did not examine the behavior of prices and qualities as a function of the trading period k. The above type of model clearly suggests that average quality would decline as a function of k. Do the experimental results support this assertion? The evidence for a quality-assuring price (Proposition 2) is clearly supportive of the kind of model suggested here, and may deserve further examination in the light of the model. Specifically, the time paths of prices as a function of delivery type can be derived from the available experimental results and the resulting pattern—compared to the theoretical results. This will provide further insights on how reputation builds (and deteriorates) over time.