March 7, 2011

To: Jonathan Levy and Jessica Almond
From: Charles A. Holt, Professor of Economics, University of Virginia

RE: Review of FCC Media Study No. 9: "A Theoretical Analysis of the Impact of Local Market Structure on the Range of Viewpoints Supplied" by Isabelle Brocas, Juan D. Carrillo, and Simon Wilkie

This review is primarily focused on the laboratory tests of the theoretical models that were developed in this study. The models were appropriately based on special cases selected as paradigms for developing key theoretical insights. These theoretical models provide important insights about incentives for non-disclosure by media agents, and the effects of competition between media agents of the same type, e.g. the same ideology. The importance of theory in this context is to develop simple paradigms that reflect key aspects of incentives and behavior that are observed in more complex market settings. The theory sections of the paper did a fine job of providing such paradigms. Moreover, the report was clearly written, with appropriate pauses to stress the intuitive side of technical results. Numerical examples were helpful for the presentation and for the experimental design. The theoretical predictions were clearly explained and summarized in simple tables. The role of experiments with human subjects in this analysis is to serve as a "reality check," i.e. to demonstrate the people facing admittedly small financial incentives will exhibit behavior patterns that roughly conform to the outline derived from theory.

The baseline setup for experiment 1 involves two media agents, who each observe a state that is not seen by the consumer (role C). One media agent has a preference for the consumer to make a high decision, and the other media agent prefers that the decision be low. The consumer's incentive is to make a decision that matches the true unobserved state. Each media agent can decide to incur a cost of "garbling" the other's attempt to disclose, i.e. of jamming a disclosure signal released by the other agent. This situation is modeled as a game with costly disclosure, in which a decision by either media agent to block disclosure will result in the consumer remaining uninformed, even if the other agent decides to disclose. The costs of blocking the release of the state information can be different for each agent. The theoretical predictions of the model tested in the first experiment are that the media agents employ "cutpoint" strategies of blocking disclosure of a state that is sufficiently "unfavorable" for them. The actual cutpoint depends on one's own cost, with higher costs resulting in more disclosure, which is intuitive. The second experiment is based on a model that introduces competition between media agents with similar interests, to evaluate the effects of competition on information disclosure and consumer welfare.

Methodology and Assumptions: Appropriateness of Experimental Procedures
The two experiments were well designed to evaluate the key theoretical predictions of the models. The structure was admittedly a "reduced form" implementation of the more general theoretical model, but the steps taken to operationalize the models were reasonable, while preserving the richness of the strategic environment faced by media agents who were the main focus of the analysis.

The experiments were carried out with financially motivated human subjects whose strategic interactions were mediated with web-based software that maintained privacy and ensured accurate recording of decisions and calculation of earnings outcomes. The earnings levels were in a range that is normally sufficient to provide real motivation for careful decision making. The instructions, provided in an appendix, were clear and carefully constructed. The instructions were of an appropriate length, and the screen shots were clear. The use of a practice round of decision making was a nice way of easing the subjects into the environment.

Reasonableness and Quality of Data
The decisions made by subjects generally indicated that they were aware of the incentives that they faced (with one exception noted by the authors). For example, when the actual state was disclosed, the person with the C role responded to the incentive to choose a decision that matched the disclosed state. Some deviations from theory were consistent with "normal" amounts of "noise" in this type of data. In Table 3, for example, the theoretical prediction is different from the midpoint of 50 in 11 cases, and in all of these cases the data average falls in the interval between the theoretical prediction and 50. This kind of "pull to center" effect has been observed on other kinds of experiments and is indicative of the effects of residual randomness on actual human decisions, as is indicated by the probit regressions that were reported in Table 4.

Appropriateness of the Conclusions in Light of the Analysis
The role of the experiments in this paper is to provide a "big picture" view on the appropriateness of the theoretical models that were used to derive conclusions. As such, the main focus is appropriately on how well the overall pattern of decisions compares with key theoretical predictions. The data obtained were sufficient to show that the salient patterns of the data conformed to the general pattern of theoretical predictions.

The main results of Experiment 1 are summarized in Figures 1-3, which indicate aggregate cutpoints for information disclosure decisions that are surprisingly consistent with theoretical predictions, especially for the case of cutpoints at 50 that is shown in figure 1. Even in treatments with asymmetric cutpoints away from 50, the empirical tendencies to withhold disclosures deviated from 50 in the predicted directions and general magnitudes in most cases. The main statement of results in Result 1 in the report is appropriate given the data analysis, particularly the "reduced form" probit estimations in Table 4. One possible generalization of the theory to consider in subsequent work would be to introduce the probit-type stochastic choice into the theory directly in a structural model, as in a quantal response equilibrium.

Experiment 2
In experiment 2, the behavior of the consumer (role C) player was erratic for two of the 5 groups, so these groups were omitted from the data analysis. This omission is justified, given the transparent nature of the errors observed, and the virtual absence of such errors for the other three groups, which were used in the analysis. This is a situation where more data might be useful. There is no opportunity for "garbled" signals in this experiment. An even more important difference between the setup here and the setup used in the previous experiment is that here there are multiple media agents of each type, with each agent seeking to be observed by the consumer. The mechanism for market discipline is largely reputational, a consumer who pays to observe a particular media agent and encounters non-disclosure is likely to switch to another media agent of that type in the subsequent round. The market competition between media agents of the same type is predicted to result in full disclosure about the state regardless of treatment (small groups versus larger groups, and high costs versus low costs of viewing an agent's disclosure decision).

Contrary to theory, there is significant non-disclosure in early rounds of the experiment, but the rate of withholding information by media agents declines in later rounds, as predicted by the Bertrand nature of the disclosure competition in the theory. There is also less withholding in the larger group, for both cost treatments. Statistical support for these observations is weakened by the small number of groups available after the two error-prone groups had been removed from the sample, and the fact that players remained in the same group for all rounds, which could create intra-group dependencies. In any case, the withholding rates were low enough that the C player almost always paid the cost to view the disclosure decision of at least one media agent. Another interesting aspect of the data was the tendency for media agents to develop reputations of reliable disclosure, with more competition between media agents and more information received by agent C in the large groups. This increase in information transmission tends to raise consumer welfare. The experiment supports the theoretical argument that increased competition between media outlets will increase consumer welfare by increase the revelation of information that is important to the consumer.