

Experimental Economics, Accounting and Society: In Memory of John Dickhaut

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Abstract

This volume consists of papers presented at a conference in memory of John Dickhaut. The conference, sponsored by the Economic Science Institute at Chapman University, focused on four areas of John's research interests during his career: Accounting and Society, Methodology in Experimental Economics, Neural Economics and Trust and Reciprocity. All of the papers make novel, interesting contributions to the study of human behavior in economic institutions and should interest readers in a range of fields including accounting, anthropology, economics, finance, neurology and psychology.

Keywords: Experimental Economics; Experimental Accounting; Accounting and Society; Trust and Reciprocity; Neural Economics; Methodology

1. Introduction

In January 2012, the Economic Science Institute at Chapman University held a conference in memory of John Dickhaut. When asked to organize the conference, we decided to invite papers from four research areas of special interest to John: Accounting and Society, Methodology in Experimental Economics, Neural Economics and Trust and Reciprocity. We received an extraordinary response rate and narrowed the field to 16 exceptionally high quality papers that were presented at the conference. While a few papers found homes elsewhere, most were submitted to the journal and appear here.

After all presentations, conference participants voted on awards for "Best Paper" and "Best Paper by a Young Researcher." The Best Paper award went to work by John with co-authors Joyce Berg and Tom Rietz (2013): "The 'Play-Out' Effect and Preference Reversals: Evidence for Noisy Maximization." The

Best Paper by a Young Researcher award went to "Transparency, Efficiency and the Distribution of Economic Welfare in Pass-Through Investment Trust Games" by Tom Rietz, Roman Sheremeta, Tim Shields and Vernon Smith (2013).

In this issue, readers will find a wide range of very interesting, high quality research that we think exemplifies John's interests and dedication to the best research in the field.

2. John Dickhaut: Life and Career

John Wilson Dickhaut, Jr. was born on February 10, 1942. He was the son of John W. and Margaret S. Dickhaut and brother of Robert Dickhaut. His father was a Methodist minister and founded the Methodist Theological School in Ohio, of which he was its first President. John's mother was a homemaker and also very actively involved in the Columbus community.

John grew up in Columbus and graduated from high school there. In high school he played basketball and was active in drama. He attended college at Duke University where he graduated with a B.A. degree in English Literature in 1964. Upon graduation, he returned to Columbus where he entered a Master's program in accounting at the Ohio State University. He received his Master's degree in 1966, but along the way was encouraged by Professor Thomas Burns to seek a PhD. He received his PhD from Ohio State in 1970. As a doctoral student at Ohio State, he was among the first scholars to employ laboratory experiments in accounting research.

John took his first full-time faculty job in accounting at the University of Chicago after graduating from Ohio State. His dissertation paper won the 1971-72 American Accounting Association's Manuscript Contest and was published in the January 1973 issue of *The Accounting Review*. While at Chicago, John established himself as an accounting scholar by publishing several papers in the *Journal of Accounting Research* and other outlets during the 1970s.

After moving to the University of Minnesota in 1976, John's career broadened into experimental economics and related areas. He made important research contributions in several areas over the course of his career. In addition to his initial interest in accounting, he explored methods for measuring and controlling risk preferences, trust and reciprocity, and the neuroscience of economic decisions. His most significant papers in these areas were published in research journals that include *Proceedings of the National Academy of Sciences of the United States*, *Games and Economic Behavior*, *Quarterly Journal of Economics*, and *Management Science*.

John spent the last two years of his career at Chapman University. He was part of the team that founded the Economic Science Institute at Chapman (along with Dave Porter, Steve Rassenti, Vernon Smith, and Bart Wilson). Because John felt a strong bond with the ESI and everyone at Chapman, it was natural that the conference would be held there.

John passed away April 10, 2010 at his California home after a battle with cancer that had lasted for several years and multiple rounds of chemotherapy. Those who knew John can attest to his courage in facing the challenge of cancer while continuing to

work up until the day he died. At the time of his death, he was the Jerrold A. Glass Endowed Chair in Accounting and Economics at Chapman University, and the Emeritus Curtis L. Carlson Land Grant Chair in Accounting Professor at the University of Minnesota, where he had served until moving to Chapman in 2008. His wife Sheri and brother Robert survive him.

3. Conference Papers

3.1. *Accounting and Society*

A session on accounting and society included three papers that explore the relationship between accounting measures, reports and behavior.

In "Framing Sticks as Carrots: An Experimental Investigation of Contract Frame and Effort in Agency Relationships," Margaret Christ, Karen Sedatole and Kristy Towry (2012) explore how penalty and bonus contracts incentivize agents differently when contracts are incomplete versus when they are complete.¹ The extant literature documents that penalty contracts have a greater effect on agent effort, but these effects have only been explored when contracts are complete. Such effects may not arise with an incomplete contract since agent effort can be affected by the trust the agent has in the principal. Thus, an agent's behavior may differ for contracts framed as a penalty versus a bonus. The findings reported by Christ et al. suggest that both agent trust and effort are lower for an incomplete contract structured as a penalty.

In "Reputation Effects Of Disclosure: An Experimental Investigation" Radhika Lunawat (2011) explores how disclosure of private information provides incentives for reputation building that improve social welfare in repeated trust games. In Lunawat's games, an investor can invest cash with a trustee, which is then (in contrast to the typical trust game) multiplied by a random amount that is initially unknown to the investor. In "disclosure" treatments, the manager can choose in advance to disclose the multiplier ex post. She hypothesizes that the

¹ This paper was subsequently published in the November 2012 issue of *The Accounting Review*.

disclosure opportunity will promote trustworthy manager behavior, increasing investment and social welfare. However, Lunawat finds that investors in disclosure treatments trust managers less than in non-disclosure treatments, resulting in lower investment and lower welfare. In a novel two-stage design, she finds that, when beliefs about manager trustworthiness are held constant, investors do invest more in disclosure treatments. This highlights an interesting interrelationship between beliefs, trust, investment and reporting regimes.

In “Managers’ Green Investment and Related Disclosure Decisions,” Patrick Martin and Donald Moser (2013) use an experiment to investigate how disclosures about green investments influence investor beliefs about the value of firms making such investments.² Specifically, the experiment tests whether a manager will make an investment that requires a sacrifice of resources by both investors and the manager, whether the manager will voluntarily disclose having made such an investment, and the extent to which investors will pay less for an equity claim in a firm making a green investment. Martin and Moser document affirmative answers to these questions, which provides evidence relevant to those concerned about the “social responsibility” of business organizations.

3.2. Methodology in Experimental Economics

Two sessions on methodology in experimental economics included five papers that make important methodological contributions to the field. Three of the papers extend research lines that John directly investigated during his career: how to incentivize preferences in experimental subjects. Two papers discuss other areas of interest to John: how subject pools and institutions affect experimental results.

In “Inducing Risk Neutral Preferences with Binary Lotteries: A Reconsideration,” Glenn Harrison, Jimmy Martínez-Correa and Todd Swarthout (2013) extend John’s long standing interest in inducing risk

preferences (beginning with Berg, Daley, Dickhaut and O’Brien (1986)). Harrison, Martínez-Correa and Swarthout strip away most of the extraneous components of typical experiments and focus on whether subjects reliably act as if risk neutral under simple lottery procedures for inducing risk neutrality. They find that typical subjects are innately risk averse, but that lottery procedures produce significant shifts toward risk neutrality.

In “The ‘Play-Out’ Effect and Preference Reversals: Evidence for Noisy Maximization,” John and co-authors Joyce Berg and Tom Rietz (2013) extend John’s research in incentives, preference induction and preference reversal. In prior research, the authors show that the patterns and rates of preference reversals are altered by (1) paying subjects in an incentive compatible manner based on gamble outcomes (Berg, Dickhaut and Rietz (2010)) and (2) inducing preferences over gambles (Berg, Dickhaut and Rietz (2003)). Both result in behavior consistent with stable preferences across gambles and random errors. Here, the authors note another difference between experiments where subjects are paid based on outcomes versus not: that the gambles are actually played out in the former case. They ask whether simply playing out the gambles has observable effects. It does, creating a pattern of responses consistent with stable preferences and random error. This implies that the ability to “keep score” using outcomes in experiments is important even when subjects are not being paid based on these outcomes.

In “Strategies for Long-run Cooperation: Experiments with Students and Workers,” Maria Bigoni, Gabriele Camera, and Marco Casari (2013) investigate behavior in repeated prisoner’s dilemma games. They ask whether different subject pools lead to different results. Using both aggregate and individual level data, they show that students appear more cooperative in general than clerical workers and are more likely to use cooperative strategies. Explicit punishment opportunities increase cooperation in both groups. Interestingly, while workers are less likely to punish, they respond more to potential punishment by employing more cooperative strategies. This has interesting implications for the generalizability of experimental results.

In “High Stakes Behavior with Low Payoffs: Inducing Preferences with Holt-Laury Gambles,”

² Subsequently, this paper won the “Hermes Fund Managers’ Best Paper” award at the Harvard Business School/Journal of Accounting and Economics Conference on Corporate Accountability Reporting in January 18, 2013.

John, along with co-authors Dan Houser, Jason Aimone, Dorina Tila and Cathleen Johnson (2013) also investigate the relationship between incentives, preference induction and behavior. Here, they ask whether behavior observed by Holt and Laury (2002) using “high stakes” (and hence, high cost) gambles can be replicated using preference induction and low payoffs. The short answer is “yes.” With the right induced preferences and low stakes, subjects behave in a manner similar to the high stakes environment. Again, this has interesting implications for the generalizability of experimental results.

In “Marshall and Walras, Disequilibrium Trades and the Dynamics of Equilibration in the Continuous Double Auction Market,” Charlie Plott, Nilanjan Roy and Baojia Tong (2013) ask precisely how equilibrium arises in the most commonly studied experimental market institution: the oral double auction. They study out of equilibrium trading and price convergence behavior in the context of early theories of market dynamics put forth by Walras, Edgeworth and Marshall. While Walras models price adjustment, Marshall models quantity adjustment. The authors overcome a range of experimental design challenges to test these issues and find support for an interesting combination of both theories. Bid and ask queues partially replicate the Walrasian auctioneer’s role: creating price adjustment. At the same time, the specific order of trading accords well with Marshall’s quantity adjustment theory. This provides interesting results for understanding market dynamics.

3.3. Neural Economics

Late in his life, John became very interested in the emerging field of Neural Economics. He was especially interested in the relationship between choice patterns observed in traditional experiments and the internal processes driving subjects. Two sessions with four papers focused on this area.

In “A Neuronal Theory of Human Economic Choice,” John and coauthors Vernon Smith, Baohua Xin and Aldo Rustichini (2011) examine risky and ambiguous individual choices. They develop and test a two-stage processing model of economic choice. According to the model, subjects first develop certainty equivalents of choices, then compare certainty equivalents. The model predicts processing

time, brain activation and tendencies to error based on tradeoffs between the costs and benefits of making a choice. Subject experience, choice complexity, ambiguity and the degree of differentiation between options drive the processing costs and benefits. Both choice data (choices, errors and reaction times) and fMRI data (brain activations) largely support the hypotheses derived from the model. The paper provides neural-based evidence consistent with traditional experimental research on the idea of choice as a labor/production process and error rates that vary with the difficulty of the comparison tasks. The ideas of choice differentiation and costs of error reduction fit nicely with John’s research on preference reversals.

In “You Can’t Gamble on Others: Dissociable Systems for Strategic Uncertainty and Risk in the Brain,” Gavin Ekins, Ricardo Caceda, Monica Capra and Gregory Berns (2013) compare choices over gambles to similar choices that involve strategic uncertainty (i.e., predicting how another person will behave). Specifically, they compare choices in a stag hunt (coordination) game to choices among simple gambles that mimic the game’s mixed strategy equilibrium. In the actual game, subjects must project the strategies of others. They argue that this affects both the choices made and the fundamental processes underlying choice. Results show that subjects playing against others are more likely to choose options with higher total social payoffs. While there were no overall differences in brain activation across treatments, there were significant differences between subjects who were likely to make the socially optimal choice. Socially optimal choices are correlated with activation of brain regions associated with the Theory of the Mind, not just regions associated with coding value. This suggests that some subjects are more likely to consider the behavior of others and can explain heterogeneity in choices across subjects.

In “Examination of Decision-making under Risk and Ambiguity across the Lifespan” Agnieszka Tymula, Paul Glimcher, Ifat Levy and Lior Rosenberg Belmaker (2012) compare risky and ambiguous choices across subjects of different ages. They also collect a range of demographic data to use as controls. They find considerable heterogeneity in choices, apparent decision-making processes and

consistency of choices. In contrast to a commonly held belief, old and young subjects have similar risk tolerances. However, older subjects are more likely to make inconsistent choices and violate first-order stochastic dominance. Younger subjects are more tolerant of ambiguity. This research helps us understand both heterogeneity in choices and how preferences and choice patterns change with age.

In “Economic Probes of Mental Function and the Extraction of Computational Phenotypes” Ken Kashida and Read Montague (2013) summarize results from fMRI studies on subjects playing multi-round versions of Berg, Dickhaut and McCabe’s (1995) trust game and related games. They show how computational analysis of behavior in these games can help us understand normal behaviors and psychiatric disorders. They discuss how subjects with autism spectrum, attention deficit hyperactivity and borderline personality disorders use different strategies in the games, appear to learn differently, make different decisions, and arrive at different outcomes. They show areas of the brain where activation differs between subjects with disorders and those without. This helps us understand how both types of subjects process tasks, learn and make decisions.

3.4. *Trust and Reciprocity*

Four papers presented in two sessions extend John’s seminal work on trust and reciprocity (Berg, Dickhaut and McCabe (1995)). Three papers modify the basic trust game and another studies a closely related sender-receiver game to study how trust relationships evolve. In the trust game, an “investor” or “sender” has an endowment, can keep it or send (invest) some or all of it to a “trustee” (or “borrower”). Sent funds are multiplied (usually by 3) and the trustee can return any portion of funds to the investor. Contrary to economic theory, a great deal of research shows that investors tend to “trust” and send a large portion of their endowment while trustees tend to be “trustworthy,” sending back a significant portion of the funds received, sometimes (but not always) justifying the initial investment.

In “Trust, Reciprocity and Interpersonal History: Fool Me Once, Shame on You, Fool Me Twice, Shame on Me,” John and coauthors Kevin McCabe,

Radhika Lunawat and John Hubbard (2011) study the evolution of trust and reputations in two-period trust games. The basic game is repeated with the same subject pairs. Subjects know this from the outset. This allows subjects to form reputations as trusting and trustworthy across the periods. Consistent with reputation building, investors invest more, and trustees return more in the first period of a two period investment game than in either the second period of the game or a game with one period. Second period results mirror single period games. Thus, the authors study the interesting issue of reputation building in trust situations.

In “Building and Rebuilding Trust with Promises and Apologies,” Eric Schniter, Roman Sheremeta and Daniel Sznycer (2013) also use a repeated trust game. Here, subjects are not aware of the second game when they play the first (nor are they told explicitly that the experiment would end after the first game). In addition, Schniter, Sheremeta and Sznycer (2013) allow communication before and between games to study how non-binding messages, promises and apologies may encourage or restore trust. Pre-play, non-binding promises of returns elicited higher investment in both games with average returns justifying investment. Trustees who broke promises in the first game tried to restore trust through higher promises and apologies before the second game. Both work to some extent, eliciting a second round of investment. However, most trustees who broke promises in the first game continued to do so in the second. This adds to our understanding of communication in reputation building.

In “Transparency, Efficiency and the Distribution of Economic Welfare in Pass-Through Investment Trust Games,” Tom Rietz, Roman Sheremeta, Tim Shields and Vernon Smith (2013) also use a repeated design while extending the game to three players. The investor sends none, some or all of a \$10 endowment to an intermediary. The sent funds triple on the way and the intermediary can send none, some or all of the received funds to a borrower. Again, sent funds triple. The borrower can return funds to the intermediary who then can return funds to the investor. This forms an intermediated investment game where transparency of transactions can be altered. The basic results from trust games generalize to three person games with varying levels of

transparency. In a one-shot game, transparency matters little. In repeated games, it matters, but only on one side: it improves economic welfare when investors see the transactions between the intermediary and borrower. Further, this shifts welfare in relative terms toward the borrower. This has interesting implications for the response to the recent financial market crisis that involved intermediated securities such as mortgage pass-through securities and other collateralized debt obligations.

In “Do Liars Believe? Beliefs and Other-Regarding Preferences in Sender-Receiver Games,” Roman Sheremeta and Tim Shields (2013) use a somewhat different game to study how trust relationships form: Crawford and Sobel’s (1982) sender-receiver game. In this game, an informed sender has an incentive to misreport information to an uninformed receiver. However, often, senders report truthful information and receivers trust senders more than predicted. This behavior can be justified by beliefs about the honesty of other players or other regarding preferences. Sheremeta and Shields tease these apart by eliciting beliefs and preferences during repeated games in which each subject plays each role. While most senders lie, most receivers believe. Elicited preferences do not explain the behavior nor would subjects best responding to their own actions in the other role of the game. What does explain behavior is an interesting set of beliefs: subjects who lie in the sender role trust others when they play in the receiver role. This makes some sense if, as a subject, your own gullibility makes it seem reasonable that your lies might be believed. This is an interesting take on how trust relationships might develop in the presence of liars.

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