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Source: *The RAND Journal of Economics*, 1997, Vol. 28, No. 0, Special Issue in Honor of Richard E. Quandt (1997), pp. S1-S4

Published by: Wiley on behalf of RAND Corporation

Stable URL: <https://www.jstor.org/stable/3087452>

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Articles in honor of Richard E. Quandt: an introduction

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and

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Richard E. Quandt, the scholar, has ranged over the length and breadth of economics, making fundamental contributions to theory and to measurement method, as well as using first-rate method in a stunning variety of applied studies. Richard E. Quandt, the teacher, colleague, and mentor, touched and encouraged a wide array of colleagues and students in his four decades at Princeton. Many of us came together in Princeton in May 1995 to celebrate his long career on the occasion of his retirement. The articles in this Special Issue grew out of that surprise conference in his honor, organized by his former student and contemporary colleague, Henry Farber. Both of us are also former students, and we served as editors of this Special Issue in partial repayment of our debts to Richard.

Richard's contributions to the study of economics take on a wide variety of forms.¹ As an econometrician, he witnessed and participated in a modelling revolution as well as the computer revolution. Many elements of the econometrician's standard analytical toolkit have their origins in his work. He was a pioneer in discrete dependent variables, in switching regime models, in tests of the standard regression assumptions, in relaxing assumptions about the distribution of error terms, and in many other now-common areas. In his long and prolific collaboration with Stephen Goldfeld, he made contributions of lasting value to econometric analysis. With the computer age, nonlinear econometrics became a real practice as well as a formal discipline. Again, Richard supported the development directly. Econometric models with explicit economic foundation are rarely cooperative, simple, or linear; they typically do not have closed-form solutions for their estimating equations. Cognizant of the importance of this problem for a wide variety of important econometrics issues, ranging from standard simultaneous-equation models to emerging new literatures, Richard, together with Stephen Goldfeld, built the GQOPT software package to support nonlinear estimation. The development of computational possibilities was a source of dramatic improvements in modelling.

As an economic theorist, Richard Quandt made important early contributions to the theory of demand and to models of oligopoly supply. His model of demand by consumers with uncertain tastes made an important contribution to demand theory. It also introduced a technology for modelling consumer heterogeneity and its effects that

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¹ His collected essays can be found in *The Collected Essays of Richard E. Quandt*, in two volumes, London: Edward Elgar series on Economists of the Twentieth Century, 1992.

greatly advanced the theory of individual choice. He worked on the impact of uncertainty, on rules of thumb, on capital rationing, on stability, as well as on equilibrium existence.

Perhaps more important for the development of economics was Richard's view that economic theory should be integrated, along with econometric theory, in applied work. He was both an example and a mentor in this. For his example, we have a long series of articles on disequilibrium econometrics, many joint with Stephen Goldfeld, and the closely related work on planned economies that formed the center of his research output over the 1980s. Having come to the United States from central Europe as its economic systems were forcibly switched to central planning, he returned to the serious study of the former Soviet satellite economies late in his career.

As a colleague, teacher, and mentor, Richard Quandt encouraged us all in the direction of the best theory and the best measurement method, and in their application to important problems. He was particularly effective teaching us how to embed economic arguments in applied work using econometrics as a tool. Throughout his teacher career, he encouraged advances in both methods and applications. Richard also played an important role in the early life of this Journal. He served as an Associate Editor of the *Bell Journal of Economics*, the *RAND Journal's* predecessor, from 1976 until 1983.

The articles in this Special Issue reflect these long-term interests. They include studies on econometric methods suitable for applied work, as well as applications using new methods. They are also all authored or co-authored by former students or former or current colleagues of Richard's. They cover a wide array of topics and methods, and so reflect some of the breadth of Richard's interests and contributions. All have been reviewed according to the usual *RAND Journal* editorial process.

Econometric methods suitable for applied work are taken up by Cragg, by Heckman and Snyder, and by Ham, Mountain, and Chan in this Special Issue. Cragg's article deals with the classic economic measurement problem of errors in variables in a regression. In the case of normally distributed regressors, errors in the variables are crippling without prior restrictions on parameters, and the model cannot be identified. In the nonnormal case, the use of higher moments to estimate the model sometimes results in identification. Cragg investigates the use of sample moments up to the fourth for testing whether the parameters are identified. He shows how to estimate the parameters consistently and asymptotically efficiently. The article demonstrates the feasibility and practicality of its estimator in a Monte Carlo study, and offers many guides to applied researchers estimating more complex models.

Heckman and Snyder investigate models of discrete choice when both chooser and choice are observed many times. They address some longstanding problems in the literature, notably the problem of correlation in values both within choosers and within choices. The solution offered by Heckman and Snyder is cognizant of the value of having a utility foundation for the choice model, and also cognizant of the importance of correlations across choices in applied work.

Ham, Mountain, and Chan address the problem of self-selection in policy treatment experiments. Traditional approaches to this important problem typically rely on exclusion restrictions between the selection (participation) equation and the equation of interest. Absent such prior restrictions from theory, it has proved quite difficult to distinguish between the impact of the treatment on behavior and the representativeness of the self-selected participants. The authors offer a novel treatment of this problem. When both selecting and nonselecting agents can be observed before the treatment, selection bias can be dealt with in a new way.

All of these econometrics articles reflect longstanding concerns of Richard Quandt, in their substance (nonnormal errors, discrete choice) but also in their value for real problems in econometric practice. Heckman and Snyder apply their estimation method

to the problem of estimating the preferences of legislators, as revealed by a series of roll call votes. Their new technique is very suitable for this problem, as both individual-bill effects and individual-legislator effects are important in this context. They reject simple views of the U.S. Congress in which legislators are distributed solely along an ideological spectrum. Their techniques reveal a several-dimensional underlying model of legislator preferences. Ham, Mountain, and Chan apply their findings to time-of-use experiments in electricity demand by small commercial establishments. Correcting for selection bias in this context, where some firms refuse to participate, is found to be important. Once the participating sample selection is taken into account, they find significant responsiveness to prices in some subgroups of establishments for some kinds of pricing experiments against a backdrop of general nonresponse.

Farber and Eisenberg are also concerned with sample selection issues in an empirical law and economics study. They consider the selection mechanism that governs the set of cases brought to litigation and its implications for the analysis of legal rules and institutions, which is necessarily based on these self-selected cases. They consider a theoretical model of the decision to litigate, where the set of cases brought affects expectations of outcomes. They introduce the concept of nonpecuniary costs of litigation, and argue that these vary more across individuals than across corporations. The selection of cases for litigation should then be a different process for individual versus corporate potential plaintiffs. Results show that this is borne out by variations between the two groups in trial rates, in delays to case resolution, and in the fraction of cases where the plaintiff wins. The identity of the defendant is much less important, further supporting the plaintiff-selection hypothesis.

Bresnahan, Stern, and Trajtenberg adapt recent developments in the estimation of demand for differentiated products to study the sources of rents from innovation in the personal computer market in the late 1980s. Aggregate demand for personal computers is modelled as being composed of individual demands satisfying generalized extreme value (GEV) preferences. They identify two dimensions along which personal computer models are differentiated: whether they are sold under a brand name, and whether they incorporate frontier technology, which in this instance refers to the presence of a 386 microprocessor. GEV preferences are agnostic about the relative importance of these two dimensions of production differentiation, as opposed to nested logit preferences, for example. Their modelling strategy is feasible because of recent advances in computation, and it represents best-practice empirical methods.

Ashenfelter, Ashmore, and Filer examine the effects of compulsory multiple contractor laws on New York City public construction projects. They analyze a sample of projects, some of which were obligated to employ multiple contractors while others were exempt from this regulation and used a single general contractor. They control for project differences by exploiting third-party estimates of project costs. Their data indicate that building projects obligated to employ multiple contractors experienced 8% higher costs on average, where the difference was largest for smaller projects, and that their construction times were longer. The naive views that general contractor profits could be appropriated by the state, or that compulsory multiple contracting might induce competition, appear to be unfounded. The recent literature on procurement contracting suggests that the rules offering the appearance but not the reality of competition can raise costs, and the data analyzed by the authors provide empirical support.

Cameron and Englin evaluate the benefits of the prevention of acid rain damage to northeastern U.S. lakes. The benefits include not only the value in use of clean lakes for active users, but also the option value of potential use by current nonusers, the set of "passive users." They estimate the benefits to active resource users, based on willingness to pay as inferred from recreational participation decisions. The potential benefits to passive users are reflected in responses to a contingent valuation survey.

Estimation of potential benefits accounts for uncertainty about both types of users. By estimating a model that predicts not only the intensity of use among active users but also the probability of use among passive ones, Cameron and Englin are able to measure the uncertainty in individuals' use. This forms the backbone of their quantification of the option value of the environmental improvement.

Finally, we close on a note of sadness. The May 1995 conference was held under the shadow of Stephen Goldfeld's illness, which had then taken a turn for the worse. Steve passed away later that year. His presence will be missed by all of us who were fortunate to know him. Richard has lost a great friend and collaborator, and the profession has lost an outstanding economist.