Consumer Demand in the United States
Lester D. Taylor · H.S. Houthakker

Consumer Demand in the United States

Prices, Income, and Consumption Behavior

Third Edition
Dedicated to the memory of H. S. Houthakker (1924–2008)
It is a great honor and privilege to speak about Henk this afternoon. Apart from members of my own family, he was the most important person in my life.

In the opening words of his article in the 1992 Festschrift for Henk, Paul Samuelson said in tribute:

Originality, depth, and versatility—those are the marks of a master scholar. Hendrik Houthakker started off with a bang: a big bang. . . . this young and unknown Dutchman resolved a long-standing challenge before he reached his second quarter century.

Paul was referring, of course, to Henk’s proof in his famous 1950 Economica article that the strong axiom of revealed preference suffices for the integrability of preferences. At the time, this unsettled question was essentially of the same importance in economics as the Riemann Hypothesis was (and still is) in mathematics. To have solved it in the manner and ease with which he did was simply an initial display of the untrammeled power of Henk’s mind.

Most of us are fortunate if we should come up with one really good idea in a career, but this was not the case with Henk. For there is virtually no area of economics that is absent something of importance from his fertile brain; the strong axiom is simply the best known. Let me note five other contributions that, in my opinion, are of nearly equal force:

(1) His 1955 paper in the Review of Economic Studies that showed how an aggregate Cobb–Douglas production function can be obtained through aggregation over firms that are distributed according to the law of Pareto—I have always
felt this result in some ways to be even more amazing than his invention of the strong axiom.

(2) His 1956 paper in *Kyklos* that likens speciation in biology to the division of labor in economics.

(3) His 1960 paper in *Econometrica* on additive preferences in which he devised the direct and indirect addilog utility functions.

(4) His work over many years on futures markets that has done much to establish the importance of speculators to stability in commodity markets, as well as to dispel the confusion surrounding Keynes’s enigmatic concept of “backwardation.”

(5) His underlying ideas concerning consumption dynamics that informed our more than 40 years of collaboration on the study of consumer behavior.

The foregoing attests both to Henk’s originality and versatility, but there is more. For in addition to his formal research, Henk was extremely interested in economic policy and was a superb policy economist. As Dale [Jorgenson] mentioned, he served on two occasions at the Council of Economic Advisers in Washington, D.C., as a senior staff economist in 1966–1967 and then as one of the three Council Members in 1969–1971. As a policy economist, Henk had an amazing ability to see a question or problem, first in its totality, and, then (untainted by ideology) in its economic aspects separate from social and political considerations. A prime example of this is in an address that he gave in December 1964 in the Annual Meeting of the American Farm Bureau Federation. In this talk, Henk provides the most cogent and trenchant analysis of the social, political, and economic problems of agriculture in modern economies that I have ever seen and is an analysis that has as much relevance for world agricultural policy today as it did then.

Despite English not being his first tongue, Henk (as noted by Bob [Russell]) was a craftsman with the language, and, as all who were acquainted with him know, he had a wonderfully subtle, and at times, piercing, sense of humor. A good example of this humor is given in some notes for a 1966 Treasury Consultants Meeting in Washington, D.C., in which he took to task ideas of price controls that were then currently being bandied about:

Price controls on particular markets are all the more useless because they tend to be capricious in their coverage. For some reason, official attention has been concentrated on primary metals, which are no more important to the economy as a whole than any other sector of similar size. In line with this bias, the molybdenum industry was dissuaded from raising its prices by five percent, yet the whole molybdenum industry is no more important (in terms of value added) than Harvard University all by itself. When Harvard recently raised its tuition by about thirteen percent, we did not hear of President Pusey being summoned to Washington.

Let me now turn to things more personal. My first contact with Henk was in the fall of 1960 as a student in his courses in econometrics and mathematical economics (then Economics 221 and 214). He was a superb teacher and lecturer. He never used notes, but was always in total command of material, and spoke in beautifully clear and concise English. From the very start of classes, it was evident that here was a
person with an extraordinary mind, but with a soul that was humble and unspoiled by fame. In line with the norm at the time, the door to his Littauer office was kept closed, but yet always open to a knock. I was in his office many, many times in the 1960s, and never once did I sense that he had more important things to do than to discuss economics with a student or colleague.

In the summer of 1962, Henk had a contract with the U. S. Bureau of Labor Statistics to develop a model for forecasting consumption expenditures for use in an interagency growth study. Although that was the summer I was working on my dissertation on another topic, Henk nevertheless generously involved me in the project. This was the start of more than four decades of collaboration, and was the basis for the 1966 and 1970 editions of our book *Consumer Demand in the United States*. As a collaborator, Henk was very trusting, and was an absolute joy to work with. He was patient and generous in both time and thought and was never dogmatic or demanding with regard to his own ideas. He had a never-ending capacity to invent, and few problems, whether theoretical or econometric, were beyond his ken to solve. He was first and foremost a scientist, and, while cognizant that nothing can ever be perfect, was always insistent that finished work never contain a known error.

Although we often discussed the possibility of a third edition of *Consumer Demand*, it was not until about 2000 that we actually set out working on one. By this time, both of us had logged a lot of additional work on demand and consumption, but mostly on different themes. Henk had focused principally on implementing the addilog models from his 1960 *Econometrica* paper and was testing the axioms of revealed preference, while I had pursued energy and telecommunications demand and done a lot of puzzling over how demand theory might be better integrated with psychology and the brain sciences. The result of our last combined effort is a totally new book that, besides including a complete redoing of the time-series analysis of the two earlier editions, adds an extensive cross-sectional investigation (reminiscent of what Henk and S. J. Prais did in their classic 1957 book) using data from the BLS quarterly consumer expenditure surveys. While work on this book was essentially completed a couple of years ago, it still awaits a publisher, and will now, it is sad to say, have to be dedicated to Henk’s memory.

While Henk was the total package as an economist and an academic, research was clearly his first love. When he retired from Harvard in 1994, he did so because he wanted to finally be able to devote his full attention to research. Between then and about 2000, he completed what, in my view, are two of his finest pieces of research, papers that one simply could not expect of someone in their 70s. The first paper (as mentioned by Bob) represents an empirical test, using international data, of the weak and strong axioms of revealed preference, while the second involves the invention of a totally new functional form for describing the distribution of income. Unfortunately, Henk was never able to see these two papers through to publication, and they still await the light of day.

Besides research, teaching, and public service, Henk was strongly committed to the general scholarship of economics and accordingly spent more than 20 years as a watchful steward of *The Review of Economics & Statistics*. However, while these years were clearly of benefit to the profession, they were very costly to Henk
personally because of the way he approached his editorial duties. For his procedure was first to read every paper submitted to the *Review* as soon it was received and then to make a decision whether to pass the paper on to referees for formal review or to return it immediately to the author(s) as unsuitable for publication. Needless to say, this was a great boon to authors, especially to young ones. However, in doing this, Henk became concerned that, in sifting through the many ideas of others, he would not be able keep separate his own, and this, in turn, led him to put his own research and publishing on hold. The cost for Henk of this selfless act of intellectual integrity was, in my opinion, a Nobel Prize.

As a final personal note: Harvard in the early 1960s was not particularly concerned with preparing its students for the classroom, and the only advice that I ever got was when Henk said to me as I was about to enter my first classroom: “Never be afraid of being wrong in front of a class.” Such is the sentiment of a modest and humble individual, and is a piece of wisdom that I have never forgotten.

To Paul’s characterization of Henk as a master scholar—Originality, Depth, Versatility—two more can be added: *Intellectual Integrity* and *Humility*. Not only was Henk a master scholar, but he was a gentle and kind soul and a genuinely good person. Teresa, Louis, Johnny, and Isabella, the world is a lot richer because of your husband and father.

Again, it has been a great privilege to be invited to make these remarks about Henk. Thank you.

Lester D. Taylor
For 20 years or so, the authors thought of putting together a new edition of our 1970 book, *Consumer Demand in The United States*, but for a variety of reasons this never came to fruition. While both of us were continuing to work on demand and consumption, our interests in doing so were somewhat divergent. HSH was focusing more on implementing the addilog models first introduced in his 1960 *Econometrica* paper, testing the Axioms of Revealed Preference, and developing a new family of functions for analyzing the distribution of income, while LDT was pursuing energy and telecommunications demand, and puzzling over how the theory of demand might be better integrated into psychology, and even more, into how the brain is structured and functions. However, it is now clear that a mechanical updating of the 1970 book would have been of little utility, and that delay has in fact been useful. For an interval of 35 years allows, not only for the use of substantive new bodies of data, and taking advantage of notable advances in econometric techniques, but also for the exercise to be tempered by sober reflection (and hopefully wisdom!) arising from many added decades of experience.

Not surprisingly, therefore, the present effort differs in major ways from the 1966 and 1970 books. While dynamics continues to be a main theme, the focus is away from development of a consistent system of equations for use in forecasting and projection (which was the primary motivation for the two earlier editions) to a more practical concentration on estimation of a broad array of price and total-expenditure elasticities. While the novelty in the 1966 and 1970 books was application of state- and flow-adjustment models, novelty in the present exercise takes three forms: (1) extensive analysis of cross-sectional data from the consumer-expenditure surveys conducted quarterly by the US Bureau of Labor Statistics (including merging into these surveys of price data collected quarterly by the American Chambers of Commerce Research Association), (2) attempts to graft the analyses onto recent advances in the neurosciences, and (3) extensive use of quantile regression in estimation.

Thirty-five years is obviously a long time between editions of a book, and the once-young authors are now hardly so. As a consequence, there undoubtedly will be some readers who feel that the theoretical structures employed do not adequately reflect the current state of the literature. This may especially appear to be the case in the cross-sectional analysis, for the models estimated with the cross-sectional data generally predate 1990. There are four reasons for this. In the first place, when the
focus is on the estimation of price and income elasticities, there is still no substitute, in our opinion, for the simple double-logarithmic function for ease of estimation, fit, and interpretation. Second, the current literature remains heavily conventional in its neoclassical orientation, which is at odds with a desire (though probably more on the part of LDT than HSH) to interpret results as much as possible in a neuroscience framework. Third, as a purely practical matter (and as will be seen), elasticities (viewed as mean tendencies) with the cross-sectional data are generally robust with respect to functional form and model sophistication. Finally, after years of estimating what probably numbers in the hundreds of thousands (maybe even millions) of demand functions, we have our own ideas of how to go about doing things, and - truth be known - are probably pretty set in our ways!

As in the first two editions, the book is targeted at a variety of readers. First, of course, is our fellow economists, who hopefully will find of interest our analyses of the BLS-CES quarterly surveys, application of the Bergstrom-Chambers model (which allows for state- and flow-adjustment within the same framework) in the aggregate time-series analysis, and our attempt to graft demand analysis onto neuroscience roots. As before, most of the models estimated are derived (often in what might seem excruciating detail) from first principles, which teachers and students in applied econometrics classes (if not others) can find useful as illustration of how empirical research is done. Industry, marketing specialists, and government and other forecasters interested in price and income elasticities provide a second target audience. Finally, specialists in econometrics may find of interest our use of quantile regression, together with the frequent appearance of long-tailed, asymmetric distributions of residuals and our various methods of effecting non-linear estimation.

Among other things, it is useful to contrast the preparation of the 1966 and 1970 books with that of the present exercise. Research for both the 1966 and the 1970 books was undertaken under contract for the US Bureau of Labor Statistics [for use in the (then) ongoing Interagency Growth Study], with some additional support provided by the Ford Foundation. The total amount involved was of the order of $75,000. Besides ourselves, upward of six research assistants, two computer programmers, and at least one secretary were involved. The 1966 edition took about 3 years to complete, and the 1970 edition about two. All work was done at Harvard Computer Center on an IBM 7094. Apart from several semesters of partial released time for LDT (together with the purchase of 4 years of survey data) provided by the Cardon Foundation for Economic Research in the Department of Agricultural & Resource Economics at the University of Arizona, no government, foundation, or private industry money has been used in the present effort. Work began on the cross-sectional analysis in the winter of 2000 and was pretty much completed by the fall of 2005. The time-series analysis was then started and was essentially finished in the summer of 2006. Thus, the present exercise has required about 7 years in total. While several of the graphs and charts have been prepared professionally, no research assistants, programmers, or secretarial assistance have

1 Also, writers of principles texts can now have a large array of up-to-date price and income elasticities at their disposal.
been used. All statistical and econometric work has been done in SAS, and all on a personal computer, much of it during summers on a laptop. Among other things, equations, which often required a turnaround of 24 h to estimate in the 1966 and 1970 editions, could be estimated in a fraction of a second in the present effort. Most data in the first two editions were obtained in the form of worksheets from the Bureau of Labor Statistics and Department of Commerce or copied from the Survey of Current Business or Historical Statistics of The United States. In the present effort, the CES surveys were purchased on CDs from the Bureau of Labor Statistics, while all of the time-series data were downloaded from the Internet. To have participated in this much change in research technology over the course of our academic careers is obviously truly amazing.

The present work is both less and more ambitious than its two predecessors. It is less ambitious in that the focus, within traditional applied demand analysis, is quite narrowly on the estimation of price and income elasticities. On the other hand, it is considerably more ambitious in the type of data analyzed and, especially, in our desire to couple consumption behavior with neuroscience and Darwinian considerations. Above all, we are cognizant of the present effort’s shortcomings. While our analysis of data from the BLS consumer expenditure surveys is the most extensive of which we are aware, we have hardly done justice to the information that these surveys contain. Socio-demographical information is employed simply as control variables, only crude efforts are made to take into account household composition effects, and aggregation information is ignored completely. Also, while we feel it incumbent for demand theory to take its cue from the brain sciences, the models and approaches that are pursued should be viewed as first attempts and our interpretations of empirical results as simply suggestive of what hopefully will be things to come.

As with any large undertaking, we have benefited from the assistance, advice, and counsel of a number of individuals, colleagues, and organizations. We are particularly grateful to Sean McNamara of the Council for Community and Economic Research for making available to us the price data collected in the ACCRA quarterly surveys, to Donald Kridel, Gary Madden, Teodosio Perez-Amaral, Paul Rappoport, Barbara Sands and Dennis Weisman, to seminar participants at Kansas State and Curtin Universities, and to the Cardon Foundation for Economic Research in the Department of Agricultural & Resource Economics at the University of Arizona. We are grateful as well for the comments (both sympathetic and critical) of several anonymous readers. Also, we are especially indebted to Iris Geisler for invaluable help in penetrating the inner sanctums of SAS and to Nancy Bannister for her superb talents in preparing the manuscript for publication. Responsibility for omissions and errors remains, of course, with us. Finally, we should mention that we feel greatly honored by the impacts that the flow- and stock-adjustment models of the 1966 and 1970 editions of CDUS have had on applied demand and consumption analysis. Needless to say, the kudos of our peers in this regard has been exceedingly gratifying.

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H.S. Houthakker
Postscript

The economics profession lost one of its giants with the passing of Professor Houthakker on April 15, 2008. Memorial services for him were conducted in Woodstock, VT, on April 27, 2008, and later at Harvard University on September 25. While the manuscript of this book in its present form was essentially complete by late 2006, some work remained on Chapters 20 and 22, which represent Professor Houthakker’s last two major undertakings of research following his retirement from Harvard in 1994. Although drafts of two papers describing this research were written by Professor Houthakker in the 1990s, nothing was ever published. In the early summer of 2005, it was decided that these papers would be included as chapters in the present book. Unfortunately, their final editing has been without Professor Houthakker’s input. Chapter 20 on the distribution of income was in excellent shape, and required little more than careful proofreading and checking of equations. However, Chapter 22 on testing of the axioms of revealed preference had some missing elements. Fortunately, R. Robert Russell of the University of California at Riverside has authoritatively been able to fill these in. Finally, I grateful to Gillian Greenough of Springer-Verlag for her enthusiastic championing of the manuscript and its expert shepherding through publication.

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Lester D. Taylor

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