Collaborative Research in Economics

The Wisdom of Working Together
CHAPTER 4

The Productivity Impact of Collaborative Research in the Economics of Risk and Uncertainty

W. Kip Viscusi

4.1 Introduction

Most collaborative research efforts involve some type of coauthorship of the research product in recognition of the fundamental contribution that the collaborative effort made to the research. Historically, extensive collaboration was not the dominant research approach among economists, who tended to be solo authors to a greater extent than researchers in the hard sciences. Adam Smith (1776) did not coauthor The Wealth of Nations, Kenneth J. Arrow (1951) wrote Social Choice and Individual Values, and Paul A. Samuelson (1996) coauthored only about 5% of his articles. The dominance of singly authored work has changed over time in economics, as coauthorship has become increasingly prevalent. As a result, my publication history and that of many other economists involve a coauthorship trajectory over the academic life cycle that reflects in part the rising role of coauthorship in economics generally as well as individual life-cycle effects.

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M. Szenberg, L.B. Ramrattan (eds.), Collaborative Research in Economics, DOI 10.1007/978-3-319-52800-7_4
In this singly authored chapter, I provide some background on the impetus for collaboration, various statistical analyses of my coauthorship experiences, and a sampling of case studies of the nature of the collaborative ventures. My selection of topics and coauthored works that I discuss is intended to be suggestive of some of the rationales for coauthorship and the dividends yielded by such collaborations rather than a comprehensive review of all the collaborations that have been important in my career. Much collaboration, particularly those that involved only single papers, will receive less attention in the discussion below. My failure to include them in my discussion is not meant to suggest that they are less consequential than the other contributions.

4.2 The Impetus for Collaboration

Collaborative efforts emerge for a variety of reasons, such as a difference in the areas of expertise needed to carry out the project. In some cases, the skill sets of the potential collaborators may be similar, but time constraints and pending deadlines may dictate that a project enlist more than a lone researcher. Empirical projects involving time-intensive survey work and data analysis often meet this test. Such collaborations may entail more than matters of convenience, as there are often components of the project that require the acquisition of specialized skills. To carry out the project successfully, there is often not a need for all the coauthors to make an investment in the project-specific skills. My first article coauthorship experience was of this type. When I was a Harvard economics graduate student working for Richard Zeckhauser, he suggested that I devote some time to learning Markov decision model techniques—a methodology we subsequently used in an article on environmental policy choices under uncertainty (Viscusi and Zeckhauser 1976).

More typically, there is a genuine division of labor among the authors based on quite different skills and interests. A notable example of this phenomenon is my textbook with John Vernon and Joseph Harrington, Jr., *Economics of Regulation and Antitrust*, which is now in its fourth edition (Viscusi et al. 2005). The desired coverage of this book included antitrust, economic regulation, and social regulation. These are distinct but related areas of economics, and there are very few economists who are well versed in all these fields. The initial edition of the book split the book’s topics among the three coauthors. While there were substantial efforts to maintain a consistent tone and approach throughout the book, there are identifiable, distinct contributions of each of the authors. Because the intent of the book was to serve as a textbook rather than to break new ground, to the
extent that the coauthors ventured onto the turf in the other topic areas, the intersections tended to focus on pedagogical and expository issues. This example is unrepresentative of my typical coauthorships in that there was more separability of the components than is typically the case.

Parallel research efforts can, however, lead to productive interactions that transform and improve the academic content of the research product. After the Exxon Valdez oil spill litigation, a series of researchers whose primary expertise was in psychology and behavioral economics (Reid Hastie, Daniel Kahneman, John Payne, David Schkade, Cass Sunstein, and myself) undertook a series of experimental studies of how juries assessed punitive damages. The studies, which were undertaken independently, generally involved large samples of mock jurors who considered alternative legal cases. I augmented the mock juror approach by administering the survey to samples of state judges as well. The research appeared in separate articles, and ultimately there was a distillation of much of this work on punitive damages in a book by Sunstein et al. (2002). Although the research studies were undertaken in parallel without much coordination, the research themes echoed across the different studies. For example, after one of the studies documented the importance of hindsight bias on jurors' assessment of punitive damages, I ran a similar survey on judges to assess whether they were subject to this same class of cognitive biases. Subsequently, in research with Reid Hastie, who had coauthored the hindsight bias juror studies, we were able to compare the behavior of the judges in my sample with the results of his jury samples to document the widespread prevalence of hindsight bias influences. This experience represents the somewhat unusual collaborative situation in which a series of independent parallel research projects interact and ultimately lead to research outcomes that extend beyond the findings of any particular study.

4.3 Assembling a Large Collaborative Team: The Hazardous Waste Policy Project

Easily my most ambitious single project from an operational standpoint was my study with James T. Hamilton of the US Environmental Protection Agency's (EPA) hazardous waste cleanup effort policy known as the Superfund. Our project for the agency sought to assess the risks, benefits, and overall desirability of hazardous waste cleanup efforts. The research led to our coauthored book (Hamilton and Viscusi 1999) as well
as ten coauthored articles. Two economics graduate students who worked on components of the project, P. Christen Dockins and Ted Gayer, also developed dissertations based on this work.

In the 1990s hazardous waste cleanup was the most prominent environmental policy issue, stimulated by the public’s concerns with contaminated landfills and companies’ concerns with cleanup costs. Although EPA had some summary data on the hazardous waste sites at the agency headquarters in Washington, D.C., there was no central repository or computerized version of all the key information needed to form a judgment on the desirability of the current policy. This informational gap made it infeasible for even well-intentioned government officials to undertake cost-effective policies. Which sites merit cleanup, and to what extent? The starting point of the project was to address the absence of the most fundamental information needed to structure a sound policy. Our army of 14 research assistants visited all the EPA regional offices and obtained thousands of pages of hard copy and microfilm that we used to construct the database. Our sample of 267 sites included an enormous body of data for each site that enabled us to undertake a fully independent assessment of the merits of alternative cleanup efforts.

Our starting point was to assess the risk levels, building up from scratch the entire analysis of the costs and benefits of the cleanup of each site. Based on the chemical concentrations at the site and the implications of these chemicals for human exposure, what risks did the sites pose? EPA utilized conservative upper bound values for a series of parameters that entered multiplicatively in the cancer risk calculation. Doing so led to a compounding of the conservatism biases, greatly overstating the actual risks and creating different degrees of bias for different sites because of differences in upper bound measures. Using mean values for various parameters based on our review of the pertinent literature, we developed risk estimates that dramatically reduced the estimated risks. Moreover, unlike the EPA risk assessments, we used a consistent methodology across all sites so that the risk estimates for the different sites were comparable. The first major result was that the current risk assessment practices greatly inflated the risks, but it was possible to construct unbiased risk assessments for each site.

Although EPA was concerned only with cancer risk probabilities, the more fundamental benefit issue for economists is the effect of these cancer risk probabilities on health. In particular, what is the value of the expected number of cancer cases that will be reduced? Thus, the extent to which
these cancer risks actually generate risks to which people are exposed should be considered. Somewhat surprisingly, EPA never was concerned with whether there were any populations exposed to the risk or if there were large numbers of people exposed. Governed by the agency’s precautionary approach, real and hypothetical risks counted equally. Hypothetical future risks at vacant land with no current or prospective exposed populations received the same weight as risks to large currently exposed populations. By matching the risks to exposed populations by block group in one of the first large-scale uses of Geographic Information Systems methods in economics, we demonstrated that this misguided agency practice led to the disproportionate emphasis on sites with no exposed populations. This emphasis in turn had the overall counterproductive effect that sites with large exposed populations received lower priority for cleanup. Because sites with these large populations often tended to have high minority representation, inattention to the role of exposed populations had the unanticipated effect of disadvantaging minority groups, such as Hispanics exposed in the western USA. The result is that the biases in EPA policy targeting that were justified on precautionary grounds were principal contributors to the environmental equity problems that the agency was tasked to address by President Clinton’s executive order.

The hazardous waste cleanup efforts not surprisingly failed the usual economic efficiency tests. At over two-thirds of the sites, the cleanup costs far exceeded $100 million per expected cancer case prevented. The agency’s targeting of the site cleanups reflected a combination of political factors, such as counties’ voting percentage, and cognitive biases, such as the availability heuristic. The analysis of the role of political factors in site cleanups drew on James T. Hamilton’s particular expertise, as much of his research has been on the political science/economics border. One of the more surprising findings is that the trade-off rates between cost and risk reflected in the housing price decisions by the public were less alarmist than the cost-risk trade-offs embodied in decisions by the regulatory agency. The housing price effect estimates for the risks of cancer led to estimates of the value of a statistical life comparable to those found in the literature, whereas the costs per case of cancer averted by the EPA cleanups were often several orders of magnitude greater.
4.4 The Coauthor Roster

My group of coauthors has included many repeat players, with most of the continuity arising from involvement in long-term research projects. At the top of the list in Table 4.1 are Joni Hersch, Joel Huber, and Richard

<table>
<thead>
<tr>
<th>Number of publications</th>
<th>Coauthor</th>
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<tbody>
<tr>
<td>20</td>
<td>Joni Hersch, Joel Huber</td>
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<td>19</td>
<td>Richard Zeckhauser</td>
</tr>
<tr>
<td>18</td>
<td>Wesley A. Magat, Michael J. Moore</td>
</tr>
<tr>
<td>16</td>
<td>Joseph E. Aldy, Thomas J. Kniesner</td>
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<td>12</td>
<td>Patricia Born</td>
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<td>11</td>
<td>Jason Bell, James T. Hamilton</td>
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<td>9</td>
<td>William N. Evans, Ted Gayer, Jahn K. Hakes</td>
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<td>8</td>
<td>Joseph E. Aldy, Thomas J. Kniesner</td>
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<td>7</td>
<td>Harrell Chesson, James P. Ziliak</td>
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<td>6</td>
<td>Fernando Antoñanzas, Roy Boyd, Irineu Carvalho, Kerry Krutilla, Joan</td>
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<td>5</td>
<td>Rovira, Robert L. Scharff</td>
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<td>4</td>
<td>Francisco J. Braña, Alan Carlin, Gerald Cavallo, Alison Del Rossi, Mark</td>
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<td>3</td>
<td>Dreyfus, Reid Hastie, Jeffrey O’Connell, Fabiola Portillo</td>
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<td>A. Berry, Glenn Blackmon, Carl Bruch, Caroline Cecot, Mariam Coaster,</td>
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<td>Mark Cohen, Christopher J. Conover, Joan Costa, P. Christopher</td>
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<td>1</td>
<td>Dockins, Howard L. Dorfman, Hristos Doucouliagos, David L. Durbin,</td>
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<td>Scott Farrow, Anne Forrest, Anil Gab, William M. Gentry, John C. Gore,</td>
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<td>J. Walsh, Kathryn Whetten-Goldstein, Christopher Wook, David H. Zald</td>
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*This list includes all articles published through 2014*
Zeckhauser. Each of these individuals has collaborated with me on an enormous and quite varied body of work extending over many years.

The longest-term coauthor of this group is Richard Zeckhauser. I prepared my undergraduate thesis under his direction at Harvard, and he served on my doctoral dissertation committee as well. During graduate school I worked for him as a research assistant. In that capacity, I had the opportunity to collaborate with him on two of my first articles. We have continued to coauthor articles, as two of our articles will be published in 2015, which will make him my most frequent coauthor. In addition to his original mentorship role, a principal reason for the coauthorship efforts is a commonality in research interests, particularly with respect to societal regulation of health and safety risks. The principal continuing approach in our joint work has been the application of benefit-cost analysis principles to health, safety, and environmental regulations. Our joint research has also involved an increased exploration of the role of behavioral factors as they relate to anti-terrorism policies, climate change policies, and federal drug regulation.

Notwithstanding the commonality of many of our interests, there is a difference in our skill set with respect to relative emphasis on economic theory and empirical research. The dividends of this coauthorship experience extend far beyond the article count and the impact of the particular articles. This collaboration early in my career helped to shape my subsequent research efforts and to deal with the strategic aspects of the publication process. I attribute much of my early ability to publish articles from my dissertation to the experience I acquired in working with him.

Joni Hersh is my wife, and we met as coauthors. The genesis of our first article, “Cigarette Smoking, Seatbelt Use, and Wage-Risk Tradeoffs,” which appeared in the Journal of Human Resources in 1990, was as follows. When she came to the Northwestern economics department as a visiting professor, she had an original employment data set based on a survey that she designed and administered in Oregon. The survey made it possible to estimate compensating differentials for job risks and to link these choices to personal risk-taking behaviors based on other questions in the survey, principally cigarette smoking and use of seatbelts. These potential linkages were of tremendous interest to me given the primary focus of my research on health and safety risks.

Much of our subsequent research also focused on determinants of wage-risk trade-offs. Perhaps our most prominent collaboration is with respect to estimation of compensating differentials for risk in which we
found that there is labor market segmentation as different labor market groups face different market offer curves for job risk. Our conceptualization of the market opportunities facing workers differed from that of standard hedonic labor market models, which assume that workers are picking off different points on identical labor market offer curves, that is, the maximum wage rate workers can receive for different levels of health and safety risk. Contrary to the standard theory, we found that different labor market groups faced quite distinct labor market offer curves with starkly different rates of trade-off between wages and risks. In particular, the wage gradient that workers receive for increases in the risk on the job is often quite different. These differences in labor market offer curves account for the lower premiums for job risks received by smokers and by Mexican immigrants (Viscusi and Hersch 2001; Hersch and Viscusi 2010). In the case of Mexican immigrants who are not fluent in English, the workers incur much greater fatality risks on the job than do other comparable workers, but they receive much lower total compensating differentials for these risks. Contrary to the usual predictions of the theory, these workers do not receive more additional wage compensation for the greater marginal risks that they incur. We have continued to collaborate on related topics that often reflect the intersection of law and economics with the regulation of health and safety, such as the proper use of value of statistical life estimates in setting punitive damages amounts in litigation contexts.

The third of my most frequent coauthors is Joel Huber, who is a marketing professor at Duke University. Our long-term collaboration has emerged out of a series of survey projects, many of which were undertaken with the late economist, Wesley A. Magat. Huber’s expertise in the design, administration, and analysis of survey data has been of continuing importance on a broad range of topics. The first set of studies involved an exploration of the role of hazard warnings for chemical and pesticide products. The surveys involved the development of alternative labels and mock consumer products and the administration of the survey to ascertain the impact of alternative labels using an experimental design. The research documented the potentially constructive effect of different warnings on risk beliefs and precautionary behavior, thus providing an economic foundation for many of the recent policy recommendations advocated by those in favor of regulations that rely on “nudge” approaches rather than on command and control regulations.

The survey studies have also examined a wide range of issues that cannot be readily resolved using available market data. These studies have
illuminated the role of ambiguity aversion in the presence of conflicting risk studies, the asymmetry between willingness-to-pay and willingness-to-accept values for changes in product risks, the determinants of household recycling behavior, and stated preference valuations for environmental benefit effects such as reductions in the risks of chronic bronchitis, cancer, and gastrointestinal illness. Many researchers in the field of marketing were more receptive than were economists to alternatives to the standard expected utility model so that this collaboration often adopted a behavioral economics perspective that served to provide a good check on the validity of more traditional economic frameworks.

At the other extreme from these regular coauthors are 45 individuals who have coauthored only a single article with me. These collaborations often arose because of specific projects or narrowly framed research questions. And, in a few instances, the people are listed because I was collaborating with a scientist who works in a field where there is often a large roster of coauthors including some people who were not directly involved in the research.

Since my publication efforts were jump-started by my collaboration with Richard Zeckhauser, who was my advisor as both an undergraduate and graduate student, I have attempted to carry on the tradition. A total of 62 of my coauthorships listed in Table 4.1 are with former doctoral students or graduate student research assistants. The most frequent collaborator in this group is Patricia Born, who developed expertise in working with detailed firm level insurance data that we used in our collaborations while she was a graduate student at Duke University. All of our coauthorship projects since then have involved similar insurance data analyses. Jason Bell has served as the computer programmer and frequent coauthor of my survey-based research with Joel Huber. William N. Evans, Ted Gayer, Jahn K. Hakes, Joseph E. Aldy, Harrell Chesson, Robert L. Scharff, and Mark K. Dreyfus have all collaborated with me on risk-related projects, almost all of which involved some aspect of the estimation of the value of a statistical life.

Notwithstanding the prominence of Joni Hersch and Patricia Born among my most frequent coauthors, there is a pronounced gender disparity in my list of coauthors. Only 19% of my collaborations in Table 4.1 are with female coauthors. This gap may be due in part to the greater representation of men in the economics profession generally or perhaps due to the nature of the research topics. The differential is not driven by the most
frequent coauthors, as female coauthors constitute a very similar 17% of the one-time coauthors.

4.5 Summary Statistics of Publications

Although economists tend to focus primarily on writing articles, my research output has consisted of both articles and books. In each case, half of my research output has been coauthored. I have written or edited 24 books. Of this group, 19 are authored rather than edited volumes. Nine of the authored books were coauthored. The five edited volumes show a similar emphasis, with two of the five edited books being coedited. The division for academic articles is similar with half of my articles being singly authored, as 167 out of 331 articles are singly authored.

The average article statistics across my career shows a similar pattern. For purposes of these calculations of annual output, I use the 1976 date of my doctoral dissertation as the starting point, thus excluding one previously published article drawn from my undergraduate thesis. As indicated in Table 4.2, the mean number of articles per year is 8.4, of which 4.2 are coauthored. Almost identical annual article publication values of 8 for total articles and 4 for coauthored articles are reflected in the medians. The distributions for the first quartile and the upper quartile indicate that the high coauthorship years are also associated with higher total article output.

4.6 Publications Over the Life Cycle

Figure 4.1 provides a graphical summary by age of the total number of articles and the number of coauthored articles. The starting point at age 23 is an article from my undergraduate thesis, and age 27 was the year I obtained my Ph.D. Apart from my two collaborations with Zeckhauser,

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<td>4</td>
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Fig. 4.1 Annual number of authored and coauthored articles

most of my articles through my late 30s were singly authored. Most of
these articles were based on topics first addressed in my doctoral disserta-
tion on job safety, which was subsequently published as a book (Viscusi
1979) and led to a series of related explorations. The reliance on sin-
gly authored work regarding the value of a statistical life has continued
throughout my career, including an article just published in early 2015.
However, I have also collaborated with other researchers on important
facets of the topic. Among my most notable collaborations not already
discussed above are estimations of age variations in both the value of a
statistical life and the value of a life year with Joseph E. Aldy, explorations
of the role of discounting years of life with Michael J. Moore, and analyses
of compensating differentials using panel data with Thomas J. Kniesner
and James P. Ziliak.

The last year in which I had no coauthored articles on any topic was at
age 36 in 1985. The number of coauthored articles jumped to five at age
39 in 1988, which marked the development of two ongoing collaborations
with colleagues at Duke University. The lines of research were separate as I
undertook studies of job risks with Michael J. Moore and a series of studies
funded by the EPA with Joel Huber and Wesley A. Magat. Nevertheless,
the singly authored article total for that year was eight, which exceeded
the number for collaborative efforts.
As the trends in Fig. 4.1 indicate, the collaborations continued at an increasing level through my 40s. The peak both in terms of total articles published in that year and total coauthored articles was at age 45 with a 17 article total, of which 11 were coauthored. However, the tally of ten coauthored articles out of 16 total articles in 1998 is not far behind. This publication surge is attributable in large part to a series of ongoing EPA-funded research projects on several different topics.

The decreased role of EPA-funded research in the past few years has stabilized my productivity over the past decade to about eight total articles per year, most of which have been coauthored. All eight of the articles at age 62 were coauthored, marking only the fourth year in which all of my published articles were coauthored.

The increased rate of coauthorship has also tracked the changes in my institutional affiliations. My coauthorship rate was 22% at Northwestern, 43% at Duke, 57% at Harvard, and 69% at Vanderbilt. This upward trend seems largely attributable to the temporal trend of coauthorship in economics and life-cycle effects rather than institutional influences. Most of my collaborations while at Vanderbilt have been with long-time coauthors, with my principal Vanderbilt colleague coauthor being Joni Hersch, who moved to Vanderbilt with me.

4.7 Conclusion

Certainly the major payoff of coauthorship has been with respect to providing insights and developing methodological approaches that would not otherwise have been possible. All of my coauthors have made genuine contributions to the research, and hopefully my contributions have been valuable as well. The result is that I have been able to pursue a much broader range of economic issues using much more diverse methodologies than would have been possible working alone. In some cases, the research would not have been feasible at all working as a solo researcher. While it is quite feasible for theorists to work alone in their offices and develop path-breaking theorems, much empirical and policy research necessarily requires a larger-scale enterprise. It is not entirely surprising that the optimal production functions for economic research often require more than one worker.

Another contributor to the value of collaboration is drawing on researchers in different disciplines. My coauthors have principally been economists. But they have also included psychologists, lawyers, mathematicians,
marketing professors, neuroscience professors, and an occasional political scientist or industry official. Drawing on insights from different fields often generates substantial rewards. For example, the emergence of law and economics as a field of inquiry and the rise of behavioral economics each are due in large part to the collaboration of economists and researchers with quite different disciplinary backgrounds.

Working with coauthors has also been a very entertaining and enjoyable experience wholly apart from the productivity effects. I hope my coauthors have enjoyed the collaborations as much as I have.

REFERENCES


