

Gordon Tullock: A Nobel Prize left unbestowed

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Abstract Gordon Tullock (1922–2014) contributed substantially to public choice theory and bioeconomics. This paper discusses some of these contributions. His scientific contributions have left a Nobel Prize unbestowed.

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JEL Classification C72 · D72 · D74 · H41

1 Introduction

From time to time an outstanding scholar emerges who sets his/her mark on science. Gordon Tullock (1922–2014) was such a scholar. His interests were far-reaching, but often centered around public choice theory and how to apply economic analysis to political issues. [Tullock \(1971\)](#) and subsequently [Becker \(1976\)](#) and [Hirshleifer \(1977, 1978\)](#) were among the economists providing early contributions to biology. [Alchian \(1950\)](#) introduced uncertainty and evolutionary mechanisms within which to understand profit maximization. See [Landa \(2012\)](#) and [Vromen \(2010\)](#) for Tullock's contributions to bioeconomics, and [Hausken \(2006\)](#) for Hirshleifer's contributions.

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2 Personal memories of Gordon Tullock

At the January 3–5, 1998 meeting of the American Economic Association in Chicago I made an amazing discovery, the launch of a new journal. I had not heard about it, the *Journal of Bioeconomics*. I was and am quite excited about all developments cross-fertilizing economics with other disciplines. I thus positioned myself in the middle of the Hyatt Grand Ballroom A at 8 a.m. for the panel on “Bioeconomics: The next economics frontier?” Seated from left to right on an elevated stage, with a lectern in the middle, and all making paper presentations, were Ulrich Witt (“Darwinism and bioeconomics”), Michael Ghiselin (“The economy of nature”), Gordon Tullock (“Historical connections between Economics and Biology”), Janet Landa (“New institutional economics and bioeconomics”), and Theodore Bergstrom (“Evolution of behavior in family games”). Discussant was Jack Hirshleifer. Tullock, President of the International Society for Bioeconomics, approaching 76 years at the time, wearing a conventional suit with tie, gave his paper using the lectern. Landa—wearing a bright red suit, and who organized the panel and distributed flyers for the launch—Secretary of the Society and Editor-in-Chief, used a microphone and moved in front of the audience. Ghiselin, with jacket and tie, was Vice-President of the Society, and Peter Corning (not in the panel) was Treasurer. The first volume and issue of the *Journal of Bioeconomics* was published in 1999. I recall leaving the auditorium with the flyer and having great expectations about this new journal. Over the last 18 years many of these expectations have been realized with productive consequences.

3 How Tullock influenced my research

Gordon Tullock’s first influence on my research was when I did my Ph.D. in multilevel game theory at the University of Chicago, 1990–1994, where Tullock received his J.D. degree in 1947. In my dissertation I designed a new multilevel game theory allowing for arbitrarily many levels of organization, arbitrarily many actors at each level, translating strategies and payoffs across levels, while honoring methodological individualism.¹ I vividly recall walking across the university campus running two prisoner’s dilemma games in two competing groups. I needed competition within groups and between groups. Individual players exert efforts, which combine into group efforts dependent on which players cooperate and defect. The players’ returns on their efforts depend on a distribution or allocation rule between and within groups. I struggled hard to find the right rule, and felt that I had to invent it myself. My first published paper (Hausken 1995a) in the journal *Rationality and Society* initially had no references. The editor

¹ Methodological individualism became a burning issue within biology from about 1968 on, influenced e.g. by Olson’s (1965) work on the logic of collective action. The discussion expanded from methodology to metaphysics. Scholars became more aware of the distinction with methodological collectivism (e.g. Marxism), realizing that it cannot be generally assumed that isolated individuals will strive towards the collective interest, referred to by Bentham (1789) as *summum bonum*. Within biology we have also experienced the controversial discussions between individual selection and group selection. Within economics such discussions have been less intense. Many economists today function happily within methodological individualism without being aware of the term.

James Coleman, who was at the University of Chicago at the time, commented that my first paper appeared to spring *de novo* from my head. He requested that I position the paper within the existing literature, and also suggested that the title should not sound like an abstract. I found this rather strange. Why should I position myself within the existing literature when no one before me had invented multilevel game theory rooted in methodological individualism? However, I did as I was told; dragged tons of literature out of the Regenstein library, and up came Tullock's (1967, 1980) "contest success function," which I found remarkably simple and powerful. So, I formulated the prisoner's dilemma game, and any other game players may play in groups, on a form consistent with a contest success function, where players exert efforts, and get some fraction of a surplus in return. I quoted Tullock (1967, 1980) in the first two papers I published (Hausken 1995a, b), thereafter in Hausken (1998, 2000a, b), in Hausken and Cressman (2004), and since then in probably more than half of the papers I have published.

Influenced by Tullock's contest success function, Hausken and Hirshleifer (2004, 2008) developed a "mating success function." It states that "the ratio in which a female distributes her mating capacity between the high-signaling and the low-signaling male types reflects their proportionate representation in the population" multiplied with "the ratio of their signaling efforts raised to a power $r > 0$," where r as the "signaling decisiveness parameter" "scales the extent to which differing signaling intensities translate into mating success" (Hausken and Hirshleifer 2004, p. 501). The decisiveness parameter is akin to the market price in a supply-demand system. It expresses the market conditions that connect the females' choices with the choices of the high-signaling and the low-signaling male types. The mating success function played a crucial role in explaining the truthful signaling hypothesis (the "handicap principle") which asserts that higher quality males signal while lower-quality males signal less or do not signal (Hausken and Hirshleifer 2004), and in showing that "heritable quality differentials are consistent with the Zahavi Handicap Principle (the "Truthful Signaling Hypothesis"). See Hausken and Hirshleifer (2008). Combining the mating success function with a congestion function and a Malthusian condition, Hausken and Hirshleifer (2004) showed that for truthful signaling hypothesis equilibria to exist high-quality males do not need to have an advantage in terms of lower per-unit signaling costs, but a cost difference in favor of the low-quality males cannot be too large. They also showed (Hausken 2006, p. 271) that truthful signaling hypothesis "equilibria may also fail if: the quality disparity among males is too great, or the proportion of high-quality males in the population is too large, or if the congestion effect is too weak. Signaling being unprofitable in aggregate, it can take off from a no-signaling equilibrium only if the trait used for signaling is not initially a handicap but instead is functionally useful at low levels. Selection for this trait sets in motion a bandwagon effect, whereby the initially useful indicator is pushed by male-male competition into the domain where it does indeed become a handicap".

Also influenced by Tullock's contest success function, Hirshleifer and Osborne (2001) and Hausken et al. (2012) modeled a "litigation success function" for lawsuits. It consists of a truth ratio which reflects the true degree of fault by the defendant, multiplied with the ratio of litigation efforts by the two contenders raised to the deci-

siveness parameter. With zero decisiveness or when the two contenders exert equal efforts, the power of truth (i.e. the underlying merits of the case) is all that matters.

Finally, influenced by the public choice theory of James M. Buchanan and Gordon Tullock's (1962) *Calculus of consent*, and Ronald Coase's (1937) transaction costs theory of the firm, Hausken and Knutsen (2010) allowed governmental units to be subjected to some of the same market forces as business firms, thus removing some of the coercive elements of government, and proposed an enabling mechanism for the creation, adjustment and dissolution of governmental units.

4 Tullock, Buchanan, Hirshleifer and Hausken on rent-seeking and conflict

Tullock (1967) observed how rent-seeking efforts to influence the government to make personally favorable policy decisions caused loss of resources. One of Tullock's strengths was to develop bright ideas before everyone else did, for example, rent-seeking. Others, such as Krueger (1974) and Posner (1975), came later. Tullock (1980) subsequently suggested a rent-seeking model based on a probabilistic contest success function. Alternatives certainly exist. For example, Hillman and Samet (1987) considered rent-seeking where the higher investment wins with certainty, which means expressing the contest as an "all-pay auction." However, that approach can also be obtained by the contest success function assuming an exponent (decisiveness parameter) on each effort set to infinity. Hirshleifer (1989) compared the ratio and difference models of relative success. He observed that Tullock's (1980) ratio form, which is probably the most widely used form, implies that neither one-sided submission nor two-sided peace between the contenders is possible as a Cournot-Nash equilibrium. Consistent with military experience, Hirshleifer (1989) proposed the difference form where the difference between the contenders' efforts determines each contender's success. Skaperdas (1996) axiomatized both forms, showing that only these two forms satisfy a set of plausible properties, with an independence from irrelevant alternatives property as the key axiom.

Buchanan (1980, p. 11) discussed rent-seeking and profit-seeking in politics and markets and argued that "the motive force of profit seeking, or rent seeking, does not vary across the institutional forms. The difference lies in the unintended results." Buchanan (1980, p. 7) observed that "the entrepreneurial activity of rent creation is quite different from that of rent seeking." An entrepreneur may enjoy early monopoly advantages, but as competitors enter, rents are dissipated. Buchanan (1980, pp. 7–8) further contrasted rent-seeking without social returns (e.g. where the queen gives a courtier royal monopoly to sell playing cards), implying unintended consequences, with profit-seeking in the competitive market. That is, "in the competitive market, by comparison, resources of potential entrants are shifted directly into the production of the previously monopolized commodity or service, or close substitutes." Using language Buchanan (1980) did not use, one contrast is that in politics the rent is often (but not always) exogenous, whereas in markets the rent is often (but not always) endogenized.

Tullock's and Hirshleifer's views on rent-seeking and conflict partly overlapped and partly differed. First, Hirshleifer (2001) stated that "rent-seeking, in its usual

connotation of maneuvering for licenses and monopoly privileges, is to conflict as milkwater is to blood, sweat, and tears.” He classified rent-seeking competition within a broader category of conflict interactions that also include election campaigns, legal conflicts (lawsuits), industrial struggles (strikes and lockouts), rivalries within families, military combats, etc.² Second, and perhaps most notably, Hirshleifer believed that the rent should be endogenized. Hirshleifer thus developed conflict and production models (e.g. [Hirshleifer 1995](#)) where the rent is both produced and fought for. Hirshleifer ([Hirshleifer 1989](#), pp. 101–102) stated that “owing perhaps to failure to perceive these wider implications, the papers in the rent-seeking literature generally do not adopt a general-equilibrium approach which would make explicit provision for the alternative productive or consumptive uses of resources employed in rent-seeking competitions. Also, what is very important, a general equilibrium model would typically make the value of the prize an endogenous variable rather than an exogenously given parameter.”

One reason the rent-seeking literature has been so successful is perhaps its simple assumptions, aided by exogenizing the rent. Often the rent is exogenous, or can be approximated to be exogenous. An exogenous rent often simplifies the analysis and enables generating many of the powerful and influential rent-seeking results ([Congleton et al. 2008](#)). But, incorrect results may follow. For example, Hausken ([2012](#), p. 504) showed that the ratio of within-group to between-group fighting is “unrealistically high for the collective rent seeking model when” each agent exerts two rent-seeking efforts, i.e. one effort within groups and one effort to impact the competition between groups. Hausken ([2012](#), p. 506) illustrated that this rent-seeking “model too often and unrealistically predicts preferences for outside over inside ownership, no divestitures, no mergers and acquisitions, multi-divisional rather than single-tier firms, the U-form of economic organization rather than the M-form when there are fewer divisions than products, and too similar group sizes when intergroup migration.”

More generally, [Hausken \(2005\)](#), in his currently most cited paper, compared and contrasted the rent-seeking model (with exogenous rent) with the production and conflict model (where the rent is endogenized in the sense of being produced) for one group, two groups, and K groups. I showed that the two approaches have both similar and different implications for intergroup migration, inside versus outside ownership, divestitures, mergers and acquisitions, multi-divisional versus single-tier firms, and U-form versus M-form of economic organization.

5 Final observations

Tullock became Distinguished Fellow of the American Economic Association in 1998. [See attached photo of Tullock showing his Certificate of Award (Fig. 1).] He might have received the Nobel Memorial Prize in Economic Sciences together with James Buchanan for their book, *The Calculus of Consent* ([Buchanan and Tul-](#)

² In particular, interpreting “fighting” (which can be substituted with synonyms such as struggle, conflict, battle, etc) as a metaphor and a subcategory of competition, Hirshleifer ([1995](#), p. 28) argued that “falling also into the category of interference struggles are political campaigns, rent-seeking maneuvers for licenses and monopoly privileges ([Tullock 1967](#)), commercial efforts to raise rivals’ costs ([Salop and Scheffman 1983](#)), strikes and lockouts, and litigation—all being conflictual activities that need not involve actual violence.”

Fig. 1 Photo of Tullock with Certificate of Award



lock 1962), but Buchanan alone received it in 1986 “for his development of the contractual and constitutional bases for the theory of economic and political decision-making.” (See http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1986/press.html, retrieved April 21, 2016.) Tullock might have received the Nobel Prize alone or together with Mancur Olson (1965), who died February 19, 1998; but the Nobel Prize Committee possibly believed that public choice theory had been acknowledged in 1986. Ghiselin (1989) speculated that Buchanan was more of an insider than Tullock, but different views exist on that. Although not receiving the Nobel Prize, Gordon Tullock has left us a rich legacy.

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