

Sorting Charles Tiebout: The Construction and Stabilization of Postwar Public Good Theory

John D. Singleton*

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Abstract

A substantial and diverse literature in economics traces its intellectual roots to Charles Tiebout's 1956 article, "The Pure Theory of Local Expenditure." Its present recognition, frequently attributed to originating the idea of "voting with your feet," however, contrasts sharply with its obscurity during Tiebout's academic career, which was tragically cut short by his passing in 1968. Penned as a qualification to Paul Samuelson's "pure theory," the article failed to influence the stabilization of postwar public good theory, despite Tiebout's engagement with key figures in its construction. Moreover, his death preceded the application of its central mechanism to public, urban, and environmental topics via hedonic, sorting, and computational general equilibrium models. Viewed in this way, the history of Tiebout's article, and thereby the history of public economics, has remarkably little to do with Tiebout himself. Professionally, though, the article reflected Tiebout's lifelong interest in issues of local economies and governance. The social and political context of urban sprawl and political fragmentation that accompanied the rapid growth of metropolitan areas, such as Chicago, Los Angeles, and Seattle, raised novel questions in local public finance for researchers before a knowledge community existed to credit their work. For Tiebout, it stimulated his collaboration with Vincent Ostrom and Robert Warren and later involvement in the burgeoning interdisciplinary field of regional science.

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1. Introduction

For a handful of articles, their reference alone is enough to invoke their central idea among economists – Akerlof (1970), Coase (1960), Lucas (1976), Stigler (1961), etc. In many cases, such papers are regarded as the foundation of an entire literature, drawing citations by later researchers that connect their work with the original insight. Tiebout (1956) – people “vote with their feet” – is another such example. This recognition predictably brings professional rewards to the originator, who often shepherds the nascent research program. The papers thereby structure the stock histories of institutions and fields, which their authors are eager to nurture. In this respect, though, Charles M. Tiebout stands out as a notable exception.

It is tempting to ascribe Tiebout’s curiosity in this regard to his early death. While teaching at the University of Washington in 1968, Tiebout, known to his friends and colleagues as Charlie, suffered a sudden heart attack and died at the age of 43. Although a well-respected regional economist, colleague, and mentor, the article for which he is remembered had gained less than 50 citations at the time of his tragic passing.¹ This explanation remains incomplete, however. As the history of his academic career reveals, while Tiebout was not present to reap where he sowed, his seed had initially fallen on dry ground.

Figures around whom the postwar history of public economics is typically framed include Richard Musgrave and James Buchanan, with Paul Samuelson’s seminal 1954 “The Pure Theory of Public Expenditure” serving as an analytical point of departure. In this narrative, Musgrave’s *The Theory of Public Finance*, first published in 1959, and Buchanan’s *The Calculus of Consent*, published in 1962 with Gordon Tullock, represent the research programs in postwar public economics that emerged from an earlier discourse. Sturn (2010) highlights the historical influences – Wicksell, Lindahl, and the German tradition in public finance – that Musgrave drew upon in his work, while Samuelson’s complex motivations in the 1954 paper are analyzed by Pickhardt (2006). The countervailing public choice research program and community built by Buchanan is the subject of Medema (2000) and (2011). Marciano (2013) traces the intellectual development of Buchanan’s thought in this period through his writings and correspondence with Samuelson. Collectively, it is a story in which Charles Tiebout only rightfully occupies a footnote.

¹ Google Scholar search, 24 September 2013. For comparison, twelve years after their publication, Coase (1960) had over 280 citations while Stigler (1961) had about 180.

Indeed, Tiebout's "A Pure Theory of Local Expenditure" (1956), penned as a qualification to Samuelson (1954), failed to influence the stabilization of postwar public good theory despite his engagement with these key figures in its construction. As a Ph.D student at the University of Michigan in the early 1950s, Tiebout first raised the idea of preferences being revealed for public goods by mobility across local communities in Musgrave's graduate seminar on public finance. Regardless, Musgrave did not find the idea especially compelling, never addressing it significantly in his own work. Musgrave did bring Tiebout into brief contact with James Buchanan at a 1959 NBER conference, though. Despite their shared interest in local public finance, however, Tiebout did not participate, either personally or intellectually, in the growing public choice research program. Not until after Tiebout's death would Buchanan engage Tiebout (1956) (Buchanan and Goetz 1972).

Similarly, Tiebout also exchanged a series of letters with Samuelson, who authored a short response to Tiebout's paper in 1958. Samuelson had questioned the practicality of the mechanism with an example of optimal marriage assignments. In his letters, Tiebout attempted to reassure Samuelson that he did not view sorting as a solution to the public goods problem either while also subtly pointing out the important differences between Samuelson's illustration and the model. Samuelson was neither persuaded nor interested by the idea and its implications. As a result, Tiebout's obscurity in the immediate postwar history of public economics was not a product of hostility to his contribution or of ignorance of it, but simply of indifference.

Public economics up through Tiebout's death in 1968, though, only provides a partial account of the field's history and almost none at all of Tiebout (1956)'s history. The following year, Wallace Oates published his test of the "Tiebout hypothesis," relating local property values to tax rates and public expenditures. This and the multitude of work that followed pursued lines of inquiry in which the Tiebout (1956) mechanism – eventually termed Tiebout sorting – plays a central role. These include studies of its empirical relevance, the theoretical and equilibrium properties, and applications to public, urban, education, and environmental topics via hedonic, sorting, and computational general equilibrium models.² Forty five years on from Tiebout's

² Recent examples of papers in this literature include Banzhaf and Walsh (2008), Bayer and McMillan (2012), Cellini, Ferreira, and Rothstein (2010), Coate (2013), and Kuminoff (2012). See Oates (1998) for a compendium of earlier work and Kuminoff, Smith, and Timmins (2013) for a recent review of related work.

passing, Tiebout (1956) boasts nearly 11,500 citations, ranking it among the most cited articles in economics. By comparison, Samuelson (1954) claims under 6,000, while Musgrave (1959) and Buchanan and Tullock (1962) own approximately 5,400 and 8,000 citations respectively.³ While the reasons later researchers took up the idea – and, moreover, credited Tiebout with the insight – are of immense interest, the focus here remains on the context in which Tiebout himself operated and authored the original paper.

Despite largely failing to excite his economist peers and colleagues with the idea in his lifetime, Tiebout continued to pursue related topics. At UCLA, this brought him into contact with the political scientist Vincent Ostrom at the Bureau of Governmental Research. Ostrom initially undertook a significant project to study the incorporation of the city of Lakewood, California, which contracted out its municipal services from Los Angeles County. Their prospective joint monograph would place the organization of metropolitan governments in an explicitly economic framework, where municipal services were bought and sold in a “quasi-market.” This drew the ire of other political scientists in the Bureau, resulting in Tiebout and Ostrom’s removal from the project and the eventual joint authorship of an article with Robert Warren instead (Ostrom, Tiebout, and Warren 1961). This brief collaboration represents a prehistory to the Bloomington school of institutional analysis (Aligica and Boettke 2009).

The history of Tiebout’s academic career, therefore, illuminates two important contexts of Tiebout (1956). First, the social context is tracked by Tiebout’s own physical and intellectual migrations. Having grown up in Greenwich, Connecticut and worked in local public administration before graduate school, Tiebout was keenly aware of the forces driving commuters into the rapidly expanding New York suburbs and of residents’ efforts to try and keep them out. In Chicago, he saw the same phenomenon at work in planned developments like Park Forest. Meanwhile in Los Angeles, the supply of metropolitan public goods, for example water and public safety, confronted a dynamic complex of local jurisdictions and municipalities of various size and capabilities. These rapid changes in American urban centers postwar – suburbanization, segregation, and political fragmentation – presented a cross-disciplinary assemblage of researchers in social science with novel questions in local public finance. This

³ Google Scholar searches, 24 September 2013.

context informed and motivated Tiebout's work, an enduring commonality with the expansive literature owning his article's heritage.

Second, although the social context fostered the study of such issues, the knowledge community necessary to recognize, acknowledge, and reward scientific credit did not yet exist. This research was thereby situated in the vacuum between established disciplinary boundaries, though it still required appeal to recognized outlets. The social and political phenomena that interested researchers like Tiebout strained received theoretical frameworks, from industrial organization to general equilibrium, and empirical methods, like input-output analysis and case studies. Tiebout, for example, attempted to frame his famous sorting model as a contribution to spatial general equilibrium theory. Similarly, his later joint work with political scientists Ostrom and Warren, in part applying the structure-conduct-performance to municipal governments, met resistance. In his own role building a community to embed this sort of work, Tiebout founded and co-directed with geographer Edward Ullman the interdisciplinary Center for Urban and Regional Studies at the University of Washington. His lasting personal legacy resides with his colleagues and students in the field of regional science.

2. Greenwich

Lying in southwestern Connecticut, bordering New York, Greenwich is located approximately 30 miles from Manhattan. Historically, this convenience, along with its charm and beaches, has made the town a desirable locale. Today, its exclusivity registers on lists of the best places to live and wealth per capita. Before World War II, Greenwich and similar communities in Nassau and Westchester counties were ground zero for housing expansion, commercial investment, and parkways as well-to-do and powerful commuters relocated to the affluent New York suburbs. In 1946 in particular, Greenwich's attractiveness put Fairfield County, Connecticut on the top of the United Nations' shortlist of places to locate its headquarters.

This intention, however, elicited a harsh and immediate opposition from Greenwich residents, who worried that the United Nations' complex would urbanize and congest their idyllic suburb's housing, streets, and beaches. As soon as the news leaked, newspaper editorials and cartoons rallied with the concerned citizens that packed local schools to organize. A town meeting at Greenwich High School, moderated by Prescott Bush, resolved to draft an official

referendum protesting the site selection (Mires 2013). This organized opposition helped steer the United Nations' committee away from the Northern suburbs of New York.

One Greenwich resident opposed to the move was a 22-year old Navy serviceman, who expressed his objection in a letter to the *Chicago Tribune*. He reflected:

Greenwich, Conn., is my home town and I am very proud of it. It is what you might call a middle of the road town; not industrial and not rural. In it people have built homes of which they may be justly proud. Now the UNO comes along and says they are going to take it away from us.

Couching the harm to residents in economic terms, he further added:

Our town will be like the parking lot for a world's fair. Our people will have to pay higher taxes to offset the loss of property. The UNO says they plan to use our beaches in the summer. I promise they won't use the town of Greenwich if the veterans have their say.

The letter was signed "Disgusted GI." Its author was Charles M. Tiebout.⁴

In the final year of a three-year stint in the Navy, Charles would return to Wesleyan University in Middletown, Connecticut in the fall. A psychiatrist at Blythewood Sanitarium in Greenwich, his father Harry Sr. is still remembered for his writings on alcoholism and treatment of Alcoholics Anonymous founder Bill Wilson. His older brother by three years, Harry Jr., had graduated from Wesleyan the year prior, beginning his graduate study in philosophy at Columbia that same fall.

Charles, though, had dropped out after failing his first semester at Wesleyan. Upon returning to school in 1946, he pursued a degree in economics. He took a research position with the Middletown Chamber of Commerce the summer before his final semester and, after completing the degree requirements in the fall of 1949, applied for graduate study. Charles Tiebout spent the spring of 1950 in Hartford, employed by the Governor's Committee of Full Employment. His title was Assistant to the Director, Lyle C. Fitch. Fitch, also a professor at

⁴ Transcript provided by Bruce Tiebout.

Wesleyan, studied local and municipal government.⁵ There, Tiebout produced a study of the summer vacation business's effect on employment in the Connecticut resort communities and shore towns. Along with this research experience, Tiebout brought his background in government and public administration to the University of Michigan, where he began his Ph.D in 1950. It is unsurprising that his cognizance of the issues facing regional and urban economic communities translated into his eventual research.

3. Ann Arbor

After his first year coursework at the University of Michigan, Tiebout worked as a research assistant for Wolfgang Stolper, who had arrived in 1949. At the time, Stolper was at work translating from German August Lösch's *The Economics of Location* (1954).⁶ Together, Stolper and Tiebout jointly authored an input-output analysis of the Ann Arbor economy for 1952 that connected regional balance of payments accounting with spatial general equilibrium (Stolper and Tiebout 1978). Lösch's book would prove influential for the development of Tiebout's thinking about local public goods.

Another recent arrival to the University of Michigan, Richard Musgrave, had joined the faculty in 1948. By the time Tiebout attended his graduate seminar in public economics in either 1951 or 1952, Musgrave had already begun work on the manuscript of *The Theory of Public Finance*, eventually published in 1959. As an extension of his thesis work at Harvard, which produced "The Voluntary Exchange Theory of Political Economy" (1939), Musgrave sought to combine the earlier theoretical contributions of Wicksell, Lindahl, and Sax with the more normative German tradition in public finance. These influences are analyzed in depth by Sturn (2010). This material would have not only formed the substance of the course Tiebout took, it also provided Paul Samuelson's understanding of the background material. Samuelson opened "The Pure Theory of Public Expenditure" (1954) with the justification that apart from "Sax, Wicksell, Lindahl, Musgrave, and Bowen," economists had neglected the theory of optimal expenditure (Samuelson 1954, 387). He further commented on the result that he "learned from

⁵ It seems probable that Fitch taught one of Tiebout's courses at Wesleyan. Fitch's "Metropolitan Financial Problems" (1957) was the first to cite Tiebout (1956). Fitch eventually became City Administrator of New York City in 1960.

⁶ See Meardon (2000) for a history of the economics of geography. Tiebout also had some fluency in German.

the published and unpublished writings of Richard Musgrave that their essential logic is contained in the ‘voluntary-exchange’ theories of public finance of the Sax-Wicksell-Lindahl-Musgrave type...” and Bowen’s work (Samuelson 1954, 388). Samuelson professed his indebtedness in this regard to Musgrave, a fellow graduate student at Harvard a few years his senior, throughout his life.⁷

Samuelson (1954), while a seminal contribution to public good theory, was intended to demonstrate the value of mathematics in economics.⁸ For this reason, the window dressing of a historically unsettled question was useful rhetorical ammunition. Pickhardt (2006) brings this and other motives to light. Samuelson’s intentional terseness in the paper, however, precipitated responses (Margolis 1955, Colm 1956) and his elaborations, with graphical aid,⁹ in a follow up article (1955) and at the winter 1955 meetings of the American Economic Association and Econometric Society. The paper also prompted an extended correspondence with James Buchanan (Marciano 2013). The basic analysis of the 1954 article, though, is familiar and remains significant in two respects: First, for establishing the formal definition of public goods as those consumed collectively. Second, for the famous condition that optimal public expenditure requires summation over individual marginal rates of substitution. Together, the implication, in Samuelson’s phrasing, is the “impossibility of [a] decentralized spontaneous solution” because “any one person can hope to snatch some selfish benefit in a way not possible under the self-policing competitive pricing of private goods” (Samuelson 1954, 389). The underlying problem of public goods is thus the person’s lack of incentive to reveal their preferences.

As Musgrave later recalled the story, he explained this logic to his University of Michigan seminar. To this, Tiebout responded with the insight with which his name is now associated: if consumers are able to shop amongst communities supplying public goods, their preferences can

⁷ After Musgrave’s passing, Samuelson reflected that “I look back with considerable embarrassment that my 1954 *Review of Economics and Statistics* paper on ‘public goods’ received so many citations. Certainly *all* that I knew of the historic ‘public goods’ literature came from oral Musgrave words and perusal of his 1939 dissertation,” (emphasis in original) Samuelson (2008, 167).

⁸ Samuelson moderated the *Review of Economics and Statistics* debate launched by Novick (1954), which included responses from Klein, Koopmans, Solow, Tinbergen, and others.

⁹ See Giraud (2010).

be revealed. In a characterization fitting Tiebout's personality, Musgrave described the suggestion as offered jokingly.¹⁰

4. Evanston

Tiebout took a position as Lecturer at Northwestern University in 1954 while still completing his dissertation work. Although he had expressed the original "voting with your feet" idea in graduate school at Michigan, Tiebout had not sought to publish it, pursuing work in regional input-output analysis and income multipliers instead. According to Charles Leven, a graduate student at the time whose committee Tiebout sat on, it was a lunchtime disagreement with a fellow Northwestern professor and University of Chicago graduate Meyer Burstein that spurred Tiebout. The discussion revolved around Burstein's frustration with paying high taxes for Evanston schools when he had no children. Tiebout pointed out that he should just move to Rogers Park then. In Leven's words,

What was interesting was the discussion I had with Charlie as we walked back to the office. "You know Chas," Charlie said, "I was absolutely right. People do have a choice over their local public goods and a way of showing their revealed preference simply by moving. In fact, that's a damn good idea. I should stick to my guns and write it up!" And he did. (Leven 2003, 236).

According to Leven's retelling, Tiebout produced a draft in a matter of days which, after circulating to a few people, he sent off to the *Journal of Political Economy*.¹¹ That it appeared there was an "inside joke" on the Chicago "Philistines" since the article demonstrated government could be efficient.¹²

¹⁰ This story is recounted in Fischel (2006). Elsewhere, Musgrave claimed it was a "concept born in my Michigan seminar of the 1950s" (Musgrave 1983, 101).

¹¹ Given the framing of Tiebout (1956) as a qualification, the publication of Samuelson (1954) in the intervening period may also have spurred him. As a response, though, the natural outlet would seem to have been the *Review of Economics and Statistics*.

¹² Though they maintained a long correspondence and Tiebout liked to poke fun of Chicago trained economists ("members of 'the flock'"), Leven's account is surely sensationalized. For example, he writes that "the JPE article was the only thing that Charlie ever wrote on local public finance, in fact any kind of public finance" (Leven 2003, 237).

A joke or not, Tiebout was careful, though strategic, in situating the short, ten page paper, which he titled “A Pure Theory of Local Expenditure” – an unsubtle allusion to Samuelson (1954). Moreover, his presentation was formal:

This discussion will show that the Musgrave-Samuelson analysis, which is valid for federal expenditures, need not apply to local expenditures. The plan of the discussion is first to restate the assumptions made by Musgrave and Samuelson and the central problems with which they deal. After looking at a key difference between the federal versus local cases, I shall present a simple model. This model yields a solution for the level of expenditures for local public goods which reflects the preferences of the population more adequately than they can be reflected at the national level. (Tiebout 1956, 416).

In a thought experiment harking back both to the discussion with Burstein and to his own background, Tiebout asked the reader to “consider for a moment the case of a city resident about to move to the suburbs. What variables will influence his choice of municipality?” (Tiebout 1956, 418). Formalizing the intuition, Tiebout assumed full knowledge and mobility and no external economies. Two key assumptions were an optimal community size and that communities above or below this level sought to attract or jettison residents to lower their costs. As examples of the empirical relevance, he cited two prototypical postwar suburban planned developments he was familiar with – Park Forest in South Chicago and Levittown, part of Nassau County. Both communities were postwar entrepreneurial responses to demand for affordable middle-class housing that offered prospective residents – frequently GIs – public amenities, like libraries, open space, quiet, and safety.

The central mechanism in the paper arose from residents moving to communities that fit their preferences, which “replaces the usual market test of willingness to buy a good and reveals the consumer-voter’s demand for public goods” (Tiebout 1956, 420). Tiebout also supposed the city managers would bid for services in a national market, with the limiting result being that the supply of public goods met the Samuelson (1954) condition. Consequently, “Spatial mobility provides the local public-goods counterpart to the private market’s shopping trip” (Tiebout 1956, 422). Rather than a rigorous proof, as Oates (2006) notes, the crux of the argument relied on establishing assumptions under which the local public sector would approximate a competitive market, with communities behaving like firms and voters like consumers. With

respect to mobility costs, Tiebout cited a Koopmans paper presented at the winter 1954 Econometric Society meetings, summarizing that “in a space economy with transport costs there is *no* general equilibrium solution as set by market forces” (Tiebout 1956, 422). Mobility, like shopping, is just the consumer-voter “pay[ing] a cost to register his demand...,” so the model ostensibly inherited the welfare and existence properties of spatial equilibria (Tiebout 1956, 422).

In his conclusion, Tiebout returned to Samuelson (1954) to situate his contribution. Samuelson had suggested that the remaining problem of public good provision was how to find the optimal levels (Samuelson 1954, 389). Tiebout declared:

It is the contention of this article that, for a substantial portion on the collective or public goods, this problem *does have* a conceptual solution... While the solution may not be perfect because of institutional rigidities, this does not invalidate its importance. The solution, like a general equilibrium solution for a private spatial economy, is the best that can be obtained given preferences and resource endowments. (Tiebout 1956, 424).

Tiebout then drew an interesting distinction between the model and its reality in his closing comments. He suggested, ambiguously, that “those who are tempted to compare this model with the competitive private model may be disappointed” (Tiebout 1956, 424). On the other hand, he argued:

Those who compare the reality described by this model with the reality of the competitive model—given the degree of monopoly, friction, and so forth—*may* find that local government represents a sector where the allocation of public goods need not take a back seat to the private sector. (Tiebout 1956, 424)

Expressing his meaning in somewhat different language, rather than as an instance of “market failure,” local public goods might be looked at as a “government success.” The subtext is clear that he placed his own self in this group. Tiebout mailed a reprint to Samuelson, with the note

“Since your works are frequently mentioned in this article, I thought you might be interested.”¹³
The letter was one of many that Samuelson received in response to his 1954 paper.

4.1. The First Samuelson Exchange

Although Samuelson did not directly reply to Tiebout’s letter, he worked on a follow up to his original papers, “Aspects of Public Expenditure Theories” – a self-conscious moderation from “the theory” – that appeared in the November 1958 issue of the *Review of Economics and Statistics*. While the main text summarized the conclusions that Samuelson drew from the debate that had ensued from “The Pure Theory...” paper, it also included an appendix titled “Strotz and Tiebout Discussions.” A smaller first section dealt with Robert Strotz’ “Two Propositions Related to Public Goods,” published in the same issue.

The majority of the appendix, though, fell under the subheading “Local finance and the mathematics of marriage,” which addressed Tiebout (1956) specifically. Samuelson summarized Tiebout’s contention as “the public expenditure theory simplifies itself at the local level – as people spontaneously join in forming homogenous communities which will legislate what each (and all) want in the way of collective goods” (Samuelson 1958, 337). He added that this “attempted solution fits in under one or another of the ‘symmetry’ principles” (Samuelson 1958, 337) – a reference to a parenthetical comment made in the original paper about “utopian voting and signaling schemes” that could be “imagined” (Samuelson 1954, 389). Such mechanisms, which Samuelson extended to include questionnaires or other devices “like a ‘parametric decentralized bureaucrat’ who *reveals* his preferences...” (Samuelson 1954, 389), he emphasized did not contradict the central theorem. In that light, despite his concession that Tiebout (1956) “goes some way toward solving the problem,” Samuelson regarded it as, at best, impractical (Samuelson 1958, 337). As evidence, he pointed to heterogeneous preferences for school expenditure within “a supposedly homogenous suburb,” suggested that people like heterogeneity, and further questioned the ethical implications of allowing groups “to ‘run out’ on their social responsibilities and go off by themselves” (Samuelson 1958, 337). He also provided an illustration of the problem as he saw it through the example of marriage.

¹³ Tiebout to Samuelson, Nov. 9 1956, Gen. Corr.: T Box 72, Samuelson Papers. Samuelson replied with a thanks Nov. 19.

Evincing no prior awareness of Samuelson's impending response by the comment that "Bob Strotz gave me a copy of your forthcoming paper," Tiebout wrote to Samuelson in May of 1958.¹⁴ Strotz, then the managing editor of *Econometrica* and the following year a visiting professor at MIT, was also a senior colleague of Tiebout's at Northwestern that he had thanked for comments in his author's note of the 1956 paper. Ignoring the main critique given in the appendix, Tiebout remarked in his short letter to Samuelson:

I'm inclined to agree with your notion that mobility provides no formal solution. In the Federal Expenditure Policy... I used such terms as "less of a problem," "some choice," and "to some extent through mobility..."¹⁵

Tiebout hoped these qualifiers would put his paper in the proper context. He clearly did not see sorting, as it would eventually be termed, as a silver bullet for public good problems. Tiebout sarcastically added in his letter:

By the time of publication I shall not be, "also of Northwestern University." I shall be at UCLA. The reason is obvious. The level and pattern of public goods provided in Santa Monica is preferable to those in Evanston.¹⁶

5. Los Angeles

Tiebout arrived at UCLA as an Assistant Professor in the fall of 1958, along with another new hire for the department that year, W. Lee Hansen. The UCLA economics department at the time was becoming increasingly centered intellectually around Armen Alchian, bolstered by the arrival of Harold Demsetz in 1960.¹⁷ In William Allen's account, it was the advent of the department's Golden Age (Allen 2010).

5.1. The Second Samuelson Exchange

¹⁴ Tiebout to Samuelson, May. 27 1958, Gen. Corr.: T Box 72, Samuelson Papers.

¹⁵ Tiebout to Samuelson, May. 27 1958, Gen. Corr.: T Box 72, Samuelson Papers.

¹⁶ Tiebout to Samuelson, May. 27 1958, Gen. Corr.: T Box 72, Samuelson Papers. Samuelson replied June 3 that "I am reassured to learn there is no basic disagreement between us."

¹⁷ Leven claimed Tiebout was important in recruiting Demsetz, who was initially resisted by some faculty members due to his Jewish heritage (Leven 2003).

When Samuelson's latest piece eventually arrived in the November 1958 issue of the *Review of Economics and Statistics*, Tiebout reinitiated their exchange from earlier that year. In particular, Tiebout now took exception with the example Samuelson had used to implicate the impracticability of his mechanism. In the appendix of the piece, Samuelson had posed the hypothetical question that given "a group of men and women who have each a preference rating for members of the opposite sex, who will end up marrying whom?" (Samuelson 1958, 337). Samuelson worked with the case of two men and two women. Their possible preference configurations yielded four separate marriage outcomes that he argued only one of which "fits Tiebout's attempt best" (Samuelson 1958, 338). This indisputably Pareto-optimal case was the first woman preferring one of the men and the second woman preferring the other man and the men reciprocating. For all other cases, Samuelson argued that a Pareto improvement might be possible "given a social welfare function" and that the configuration arrived at would not be unique (Samuelson 1958, 338).

Tiebout's December 1958 letter to Samuelson bluntly confessed "I don't see what the mathematics of marriage has to do with local public goods."¹⁸ He made three points, all arguing that the two-sided matching problem Samuelson had posed was inapt. Using his humor to be indirect and remain deferential, the objections Tiebout offered were nevertheless substantive:

- 1) In terms of a conceptual model – not real world except as a matter of degree – boys A and B have an infinite number of girls to choose from. To be sure, this makes for a rather trivial assignment problem.
- 2) Disregard this. Do girls (communities) really have any preferences? Like private firms, all they want are customers (husbands).
- 3) I suppose there might still be a problem if A, with a slight preference for girl 1, got there before B who is wild with passion about 1. Yet, I wonder if this applies to public goods. Aren't they polygamous?

These are some things which bother me.¹⁹

In his reply, Samuelson conceded the imprecision of the analogy. Still, he maintained its basic relevance, stating "I don't believe communities as having a sole or a separate existence from the

¹⁸ Tiebout to Samuelson, Dec. 17 1958, Gen. Corr.: T Box 72, Samuelson Papers.

¹⁹ Tiebout to Samuelson, Dec. 17 1958, Gen. Corr.: T Box 72, Samuelson Papers.

individuals making them up. I think the problem of where people will live is a problem of what associations different individuals voluntarily make.”²⁰ This comment reflected his work on social indifference curves (Samuelson 1956).

Samuelson’s assessment of Tiebout’s contribution did not improve with time. He continued to insist that Tiebout had aimed and failed in disproving the 1954 result. In 1964, he drafted a paper, never published, titled “Public Good Theory: Optimal, Feasible Pricing of Rail, Bridge, and Road.” Samuelson described a subset of reactions to his 1954 “impossibility theorem” as “pain and disappointment” because the analysis “proved that there existed no Invisible Hand of decentralized pricing that could provide an efficacious algorithm to lead to the optimum.”²¹ Among those resistant to this finding he named (in order) Enke, Buchanan, Tiebout, Coase, and Friedman, adding the comment that “not one of the writers named, nor anyone else to my knowledge, has been able to refute the theorem.”²²

5.2. The NBER Conference

In 1959, James Buchanan hosted a NBER sponsored conference, “Public Finances: Needs, Sources and Utilization,” at the University of Virginia in Charlottesville, Virginia. Musgrave, a co-organizer of the event, invited Tiebout to participate.²³ In a session on state and local governments, Tiebout and Musgrave each presented papers, with Buchanan serving as a discussant. The paper that Tiebout presented, “An Economic Theory of Decentralization,” posited a social planner making a joint choice of the level of public goods to be provided and a method of allocating them. He noted that absent public goods at all, private good production would realize a “Lösch spatial patterning,” an equilibrium construct for the arrangement of businesses within a spatial plane laid out in Lösch’s book. Except for extreme cases, the planners’ problem posed necessarily involved a spatial dimension in which decentralized

²⁰ Samuelson to Tiebout, Dec. 23 1958, Gen. Corr.: T Box 72, Samuelson Papers.

²¹ “Public Good Theory: Optimal, Feasible Pricing of Rail, Bridge, and Road,” Feb. 7 1964, Box 143, Samuelson Papers.

²² “Public Good Theory: Optimal, Feasible Pricing of Rail, Bridge, and Road,” Feb. 7 1964, Box 143, Samuelson Papers. Samuelson also later intimated in a 1988 letter to Musgrave that “In 1954 I was nihilistic on the free-rider problem – too nihilistic, in the sense that Grove and Ledyard and Vickrey (and Tullock, and someone named Clarke in a Chicago thesis that Stigler almost blackballed) have proposed various (almost) cheat-proof algorithms devised to motivate people to reveal their true taste for the public goods,” Samuelson to Musgrave, Aug. 23, 1988, Box 54, Samuelson Papers.

²³ Author’s interview with Buchanan, Nov. 5 2012.

distribution through “branch” governments became efficient. This was because “benefits from public services may not accrue equally to all residents of a region” (Tiebout 1961, 80).

Starting from the assumption of uniform tastes and incomes, Tiebout worked with police protection as an illustration. Although a pure public good within a precinct, police protection of a city required determining the optimal number of precincts to provide uniform protection within the city (Tiebout 1961, 82). With costs a function of precinct size and some curvature assumed on the costs and output, an optimal precinct size could be obtained for any given level of output. In principle, taxpayers would be willing “to join with their neighbors” to realize this minimum cost (Tiebout 1961, 86). Rhetorically, the example was designed to show the importance of the spatial dimension, in which fiscal federalism was efficient, for a simplified case; i.e. determining the location of many public goods was as important as determining their level. Tiebout proceeded to discuss relaxations, such as when the benefits are diminishing in distance from the “site of production,” as with fire protection, hospitals, or parks. To determine the boundaries in such cases, he supposed a procedure in which a “city planner interviews various residents.” (Tiebout 1961, 88). By assumption, residents would reveal their true willingness to pay.

Describing the resulting “fiscal patterning” of the thought experiment, Tiebout concluded: “When all agencies and branch governments are operating, the spatial patterning will be similar to that for the private sector... The public sector, in other words, will develop along a Lösch pattern” (Tiebout 1961, 91). This paralleled his 1956 paper’s substitution of firms with communities in the competitive market model. The hypothetical was intentionally unrealistic, however. In particular, it ignored heterogeneity and the overriding problem of preference revelation precisely because this was the place Tiebout wanted to show that sorting would be useful. Tiebout argued that with differences in tastes, “Instead of taking the people as given and trying to fit the nonnational public goods pattern to them, offer a varied pattern of public goods and make it possible for the people to move to suit their tastes” (Tiebout 1961, 92). He summarized: “To the extent that demands differ, a partial solution [to the problem of determining taxpayer preferences] at the nonnational level is offered through the mobility of people to communities where the pattern of services provided suits their tastes” (Tiebout 1961, 96).

In this presentation, therefore, Tiebout framed sorting as a contribution to spatial general equilibrium theory with public goods, drawing a correspondence to Lösch’s work. This is

all the more clear from an examination of a paper Tiebout gave to the Regional Science Association in 1957. There, Tiebout directly quoted Lösch's declaration that for general spatial equilibrium "there is no scientific and unequivocal solution for the location of the individual firm, but only a practical one: the test of trial and error" (Tiebout 1957, 79). Tiebout cited Koopmans and Beckman (1957) in this regard as a formal demonstration. He elaborated:

This situation may be contrasted with that of finding the optimal short-run output for the firm. Here the conditions and the path, via the step-by-step movement along the quantity axis, may be stated.

The situation with location theory, on the other hand, is analogous to that of a pure theory of public expenditures. As Samuelson shows, the conditions of a public expenditures optimum may be stated, but there is no market mechanism by which this optimum may be reached. (Tiebout 1957, 79)

By extension, Tiebout (1956)'s sorting mechanism becomes the analogue of Lösch's "trial and error" for Tiebout.

In his comments on the Musgrave and Tiebout papers as discussant, Buchanan recognized the insight behind mobility across communities. Putting the externality arising from common consumption of public goods in terms of an impossibility to "trade" and equalize marginal rates of substitution, he noted that "individuals can, in effect, 'trade' public goods by shifting from one locality to the other" (Buchanan 1961, 127). He also connected the incentive to zone, noted by Tiebout as a means whereby "the rich avoid paying taxes for the poor" (Tiebout 1961, 92), with congestion, which is absent for pure public goods. This point anticipates the theory of club goods that Buchanan later developed (Buchanan 1965), a complementarity and similarity with Tiebout sorting that sometimes provokes questions of a genetic link between the two ideas.²⁴ Buchanan's comment here is weak evidence of one.²⁵ While in this regard the two appeared to be on a similar intellectual wavelength and interested in similar problems at the same time, their personal interaction began and ended in Charlottesville. By this time, Buchanan's views on public finance had already stabilized (Marciano 2013). Later Buchanan would return to Tiebout's idea with Charles Goetz, who was instrumental in recruiting Buchanan

²⁴ Scotchmer (1994) is a thoughtful analysis of the theoretical relationship. See also Oates (2006).

²⁵ Buchanan (1965), which extended Samuelson's (1954) taxonomy, does not cite Tiebout (1956). Buchanan did not link his contribution in his own mind with Tiebout's (interview with author).

to Virginia Polytechnic Institute, in the inaugural issue of the *Journal of Public Economics* (Buchanan and Goetz 1972).

For his part, Musgrave's "epic" – as Tiebout later referred to it – *The Theory of Public Finance* finally appeared in print in 1959. Therein, he offered a page length discussion of the implications of Tiebout (1956) for the efficient supply of public goods. Musgrave noted the simplifications, but concluded, consonant with Tiebout's framing in the conference paper, that "the possibility of moving to other communities establishes something equivalent to a market mechanism in local finance" such that "the task of finding a satisfactory solution is simplified" (Musgrave 1959, 133). While, in contrast with Samuelson, his qualifications hinted at questions about both the properties of sorting under relaxed assumptions and its empirical importance, pursuing these would not be taken up by Musgrave. Local public finance remained a "special case." Both Tiebout and Tiebout (1956) passed unclaimed between the two approaches that came to characterize postwar public economics.²⁶

5.3. The Lakewood Project

The same year that Tiebout arrived at UCLA, 1958, Vincent Ostrom also accepted an offer to return, having earned his Ph.D in political science eight years prior from UCLA. The offer included a part-time appointment in the Bureau of Governmental Research, a research center at the university directed by Winston Crouch and partially funded by the Haynes Foundation. Ostrom brought a prior history with both back to UCLA. Crouch had been the vice-chairman of his thesis committee, while Ostrom's dissertation, "A Study of Water Policies and Administration in the Development of Los Angeles," had been published by Haynes.

Ostrom had spent 1955-56 at the Center for Advanced Study at Stanford. His plan of study there included continuance of a "community study of policy formation in which theoretical inquiry and research design have been my special concern."²⁷ He elaborated:

²⁶ These competing approaches to public finance surface in the subsequent sorting literature traced to Tiebout (1956), typically as either median-voter or manager-entrepreneur models of local public good determination.

²⁷ Plan of Study at the Center for Advanced Study, Palo Alto, CA, 1955-56.

A more serious part of efforts will be to extend this work in the direction of a systematic approach to the study of the political system of a local community with particular implications for the comparative study of political behavior.²⁸

Specifically, Ostrom was already interested by the implications of the 1954 incorporation of the city of Lakewood, California – a postwar planned development like Levittown and Part Forest – which, in an unprecedented political bargain, would contract out the majority of its municipal services with Los Angeles County. The “Lakewood Plan,” as it came to be called, became the model for succeeding contract cities.

At the Bureau of Governmental Research, Ostrom acted as director of the “Lakewood Project” in the temporary absence of John Bollens. With money from the Haynes Foundation, Ostrom organized the Project around a seminar the Bureau held hosting local administrators, like the mayor of Lakewood, and for graduate student presentations. Tiebout began attending these seminars, where he connected with Ostrom. Interested and able to help develop the theoretical framework, Tiebout joined the project.

The minutes of a 1959 seminar of the Bureau outlined their intents:

The Lakewood Project – the study of the contract system in Los Angeles – will be approached in light of the model furnished by economics. Rather than as a limited examination of relations between political units, this study will evaluate the performance of the county government as a seller of goods and services, and of particular local units as the buyers of these services, as unions organized to meet the demand of consumers (the citizens).²⁹

Economic theory would be invaluable for escaping political scientists’ “compulsion to want to superimpose a structure in such political situation[s].”³⁰ The document explicitly adopted the structure-conduct-performance analysis from industrial organization. A rough draft of the first chapter related the “quasi-market” contract system to Tiebout (1956) and outlined the

²⁸ Plan of Study at the Center for Advanced Study, Palo Alto, CA, 1955-56.

²⁹ “An Approach to Metropolitan Areas,” Research Seminar Minutes, Sept. 23 1959, Bureau of Governmental Research.

³⁰ “An Approach to Metropolitan Areas,” Research Seminar Minutes, Sept. 23 1959, Bureau of Governmental Research.

monograph, which would also analyze the “poli-centric” political system’s efficiency.³¹ This overt adoption of economic theorizing did not sit well with everyone at the Bureau, however.

These tensions eventually came to a head. Following a March 1960 meeting with Crouch and Bollens, Ostrom wrote a letter to Crouch, which cc’ed Tiebout, conveying his belief that the situation created was “intolerable so far as my interests are concerned.”³² The letter described the nature of their objections. Crouch and Bollens were “anxious about the theoretical context in which the Lakewood study was being developed.”³³ The description of communities as “competitors,” a municipal services “market,” and of residents and city managers as “shoppers” would have been anathema. They suggested that the draft of the first chapter, written with Tiebout, be adapted as a journal article instead and removed from the project altogether. In his response, Ostrom emphasized: “My interests in this study are explicitly of a theoretical nature. I do not care to associate myself with another survey of some municipal problem.”³⁴

Ostrom was incensed. He suggested turning over the project report to Bollens, effectively removing himself and Tiebout from the study, and acquiesced to pursuing the theoretical development through other outlets. The eventual product published by the Bureau did not bear his, nor Warren or Tiebout’s names. The episode and the disappointment it caused him led Ostrom to entertain outside offers to leave UCLA.³⁵ As for the theoretical project, Tiebout, Ostrom, and Warren resolved to rework the chapter into a paper, which they sent to the *American Political Science Review* that developed the analysis of polycentric political systems – the “multiplicity of federal and state agencies, counties, cities, and special districts that govern within a metropolitan region” (Ostrom, Tiebout, and Warren 1961, 831). To Ostrom’s frustration, the reviewers’ suggested eliminating the theoretical content, causing a lengthy back and forth.³⁶ Additionally, Ostrom wanted to adapt their Lakewood Project research into a book, “A New Approach to the Study of Metropolitan Government,” that would expand upon and clarify the

³¹ “Chapter 1: The Problem of Metropolitan Government,” no date.

³² Ostrom to Crouch, March 21 1960.

³³ Ostrom to Crouch, March 21 1960.

³⁴ Ostrom to Crouch, March 21 1960. Ostrom was also upset about the “strange ethic of non-controversy and non-criticism” that he felt destroyed the research seminar at the Bureau. He relayed his belief in the importance of a research seminar in response to an inquiry about his availability from Arizona shortly thereafter (Ostrom to Currin, Dec. 7 1960).

³⁵ Ostrom to Hinderaker, Dec. 6 1960; Ostrom to Shields, Dec. 7 1960.

³⁶ Ostrom to Warren, Nov. 21 1960.

contents of the article.³⁷ Ostrom pitched the book collaboration under his and Tiebout's names to potential publishers, though it never materialized.³⁸

While the joint monograph was abandoned, developing and applying a theoretical framework for institutional analysis continued to motivate Ostrom. He began working along these lines with the then UCLA graduate student he would eventually wed, Elinor Awan. The two moved to the University of Indiana in 1964, making Ostrom, Tiebout, and Warren's collaboration a prehistory of the Bloomington school centered around the Ostroms (see Aligica and Boettke 2009). The Ostroms' programmatic 1965 article, "A Behavioral Approach to the Study of Intergovernmental Relations," can be viewed as a realization of many of Vincent's ambitions articulated for his year at the Center for Advanced Study.³⁹

6. Seattle

In the wake of the collapse of the Lakewood Project, Robert Warren joined the political science department at the University of Washington in Seattle in 1960, having earned his Ph.D under Ostrom's mentorship. Warren's work, "A Municipal Services Market Model of Metropolitan Organization" (1964), furthered the development and analysis of polycentric systems. The theoretical framework treated city councils and professional administrators in a decentralized governmental arrangement as consumers competitively bargaining over municipal service contracts, akin to the assumption supposed in Tiebout (1956) and increasingly reflective of the urban reality. Tiebout discussed the paper at the 1962 annual meeting of the American Political Science Association. Tiebout's own subsequent work in local public economics examined economies of scale and cost-benefit analysis in the public sector, both in the context of the "chaos" of metropolitan finance arising from "balkanization" and epitomized by the Lakewood Plan (Houston and Tiebout 1962; Chinitz and Tiebout 1965).

Tiebout had also decamped from UCLA to the University of Washington, where he was granted tenure and associate status on a joint appointment with the business school and the

³⁷ Ostrom to Hogen, Nov. 21 1960; Ostrom to Warren, Nov. 21 1960.

³⁸ Grimes (Dorsey Press) to Ostrom, Dec. 1 1960; Ostrom to Ierardi (Wiley and Sons); Ostrom to Warren, Nov. 21 1960. Tiebout and Houston (1962) makes reference to the Lakewood Plan and develops the analysis in ways suggested by the Chapter 1 rough draft of the Project manuscript, such as the role of economies of scale.

³⁹ The Ostroms also later became actively involved with the Public Choice Society and close friends with Buchanan.

department of economics in 1962. In 1963, he helped found the Center for Urban and Regional Studies at Washington, which he would co-direct until his death. Warren joined the interdisciplinary collection of researchers affiliated with the Center, which also included professors in business, civil engineering, history, law, public affairs, sociology, and urban planning. From the economics department, Douglass North was an affiliate. Tiebout shared the directorship with geographer Edward Ullman. While the themes that provoked Ostrom, Tiebout, and Warren's erstwhile collaboration on the Lakewood Project reappeared in their separate work thereafter, their later inquiries remained uncoordinated. Tiebout and Warren failed to recruit Ostrom, still at UCLA, to the University of Washington around 1963, while Tiebout spurned an offer from Bloomington in 1966.⁴⁰ By that time, Tiebout was occupied with activities connected with the Center and busy traveling for consulting and policy work.

7. Conclusion

Warren wrote to Ostrom on January 16th, 1968:

Perhaps you will have heard by the time this reaches you, but I thought it important to write that Charlie Tiebout has died. He was working in his office early this morning and had a heart attack. I have none of the details but apparently it was impossible to revive him.

It is a strange and disquieting task to write this letter. Yes, I saw Charlie yesterday. No, no one expected it. Yes, there are many things to say but "a friend is dead" covers them all. (Warren to Ostrom, Jan. 16 1968).

At the time of his passing, Charles Tiebout was not regarded as a public economist nor was his name associated with the massive literature that would grow from Oates's 1969 "test" of the "Tiebout hypothesis." In his shortened lifetime, those capable of crediting his now famous insight did not regard it as interesting and the academic community that would eventually credit it did not yet exist. Rather, Tiebout was best known for his irreverent humor, generosity with colleagues and students, and for his work in regional economic analysis. The latter included his

⁴⁰ Tiebout to Martin, Jan. 12 1966. Also, in a 1963 – the year before the Ostroms would move to Bloomington – letter to Ostrom, Tiebout cryptically remarked, "Needless to say, I am pleased about the Indiana possibilities, not that it enhances our attractiveness, but because it gives evidence of the recognition that some fatheads failed to give" (Tiebout to Ostrom, Oct. 30 1963).

collaboration with W. Lee Hansen on a model of the California economy (Hansen and Tiebout 1963) and analyses of the implications of defense and space expenditures for local economies (Peterson and Tiebout 1964, Houston and Tiebout 1964). His expertise was frequently consulted by policy and law makers. Tiebout served on the Economic Development Agency for California, the Economic Advisory Committee to the Governor of Washington, the Transportation Advisory Council of Washington, and the Regional Economics Advisory Committee and Economic Development Administration of the Department of Commerce.

References

- Aligica, Paul Dragos and Peter J. Boettke, 2009. *Challenging Institutional Analysis and Development: The Bloomington School*. New York: Routledge.
- Allen, William R., 2010. "A Life Among the Econ, Particularly at UCLA," *Econ Journal Watch* 7, no. 3: 205-234.
- Banzhaf, Spencer H., and Randall P. Walsh, 2008. "Do People Vote with Their Feet? An Empirical Test of Tiebout's Mechanism," *The American Economic Review* 98, no. 3: 843-863.
- Bayer, Patrick and Robert McMillan, 2012. "Tiebout Sorting and Neighborhood Stratification," *Journal of Public Economics* 96: 1129-1143.
- Buchanan, James, 1961. "Comments," in *Public Finances: Needs, Sources, and Utilization*, ed. James Buchanan. Princeton, NJ: Princeton University Press: 122-129.
- _____, 1965. "An Economic Theory of Clubs," *Economica* 32, no. 125: 1-14.
- Buchanan, James and Charles Goetz, 1972. "Efficiency Limits of Fiscal Mobility: An Assessment of the Tiebout Model," *Journal of Public Economics* 1, no. 1: 26-43.
- Buchanan, James and Gordon Tullock, 1962. *The Calculus of Consent: Logical Foundation of Constitutional Democracy*. Ann Arbor: University of Michigan Press.
- Cellini, Stephanie Riegg, Fernando Ferreira, and Jesse Rothstein, 2010. "The Value of School Facility Investments: Evidence from a Dynamic Regression Discontinuity Design," *The Quarterly Journal of Economics* 125, no. 1: 215-261.
- Chinitz, Benjamin and Charles M. Tiebout, 1965. "The Role of Cost-Benefit Analysis in the Public Sector of Metropolitan Areas," in *The Public Economy of Urban Communities*, ed. Julius Margolis. Washington, D.C.: Resources for the Future.
- Colm, Gerhard, 1956. "Comments on Samuelson's Theory of Public Finance," *The Review of Economics and Statistics* 38, no. 4: 408-412.
- Coase, Ronald, 1960. "The Problem of Social Cost," *Journal of Law and Economics* 3: 1-44.
- Coate, Stephen, 2013. "Evaluating Durable Public Good Provision using Housing Prices," working paper.

- Fischel, William A., 2006. "Footloose at Fifty: An Introduction to the Tiebout Anniversary Essays," in *The Tiebout Model at Fifty: Essays in Public Economics in Honor of Wallace Oates*. Cambridge, MA: Lincoln Institute of Land Policy.
- Fitch, Lyle C., 1957. "Metropolitan Financial Problems," *The Annals of the American Academy of Political and Social Science* 314, no. 1: 66-73.
- Giraud, Yann B., 2010. "The Changing Place of Visual Representation in Economics: Paul Samuelson Between Principle and Strategy: 1941-1955," *Journal of the History of Economic Thought* 32, no. 2: 175-197.
- Hansen, W. Lee and Charles M. Tiebout 1963. "An Intersectoral Flows Model of the California Economy," *The Review of Economics and Statistics* 45: 409-418.
- Houston, David B. and Charles M. Tiebout, 1964. "Defense-Space Expenditures and Western Economic Growth: The Non-Manufacturing Impact," Regional Science Association meeting, Tempe, AZ.
- _____, 1962. "Metropolitan Finance Reconsidered: Budget Functions and Multi-level Governments," *The Review of Economics and Statistics* 44, no. 4: 412-417.
- Koopmans, Tjalling and Martin Beckmann, 1957. "Assignment Problems and the Location of Economic Activities," *Econometrica* 25, no. 1: 53-76.
- Kuminoff, Nicolai, V. Kerry Smith, and Christopher Timmins, 2013. "The New Economics of Equilibrium Sorting and Policy Evaluation Using Housing Markets," *Journal of Economic Literature* 51, no. 4: 1007-1062.
- Kuminoff, Nicolai, 2012. "Partial Identification of Preferences in a Dual-Market Sorting Equilibrium," working paper.
- Leven, Charles, 2003. "Discovering 'Voting With Your Feet,'" *The Annals of Regional Science* 37: 235-238.
- Lösch, August, 1954. "The Economics of Location," trans. W.H. Woglom and Wolfgang F. Stolper. New Haven: Yale University Press.
- Marciano, Alain, 2013. "Why Market Failures Are Not a Problem: James Buchanan on Market Imperfections, Voluntary Cooperation, and Externalities," *History of Political Economy* 45, no. 2: 223-254.
- Margolis, Julius, 1955. "On Samuelson and the Pure Theory of Public Expenditure," *The Review of Economics and Statistics* 37, no. 4: 347-349.
- Meardon, Stephen J., 2000. "Eclecticism, Inconsistency, and Innovation in the History of Geographical Economics," *History of Political Economy* 32, no. 5: 325-359.
- Medema, Steven G., 2011. "Public Choice and the Notion of Creative Communities," *History of Political Economy* 43: 225-246.
- _____, 2000. "'Related Disciplines': The Professionalization of Public Choice Analysis," *History of Political Economy* 32, Supplement: 289-324.

- Mires, Charlene, 2013. *Capital of the World: The Race to Host the United Nations*. New York: NYU Press.
- Musgrave, Richard, 1961. "Approaches to a Fiscal Theory of Political Federalism," in *Public Finances: Needs, Sources, and Utilization*, ed. James Buchanan. Princeton, NJ: Princeton University Press: 97-122.
- _____, 1983. "Public Finance, Now and Then," in *Public Finance in a Democratic Society, Volume I*. New York: NYU Press: 89-101.
- _____, 1959. *The Theory of Public Finance*. New York: McGraw-Hill.
- _____, 1939. "The Voluntary Exchange Theory of Political Economy," *Quarterly Journal of Economics* 53, no. 2: 213-237.
- Novick, David, 1954. "Mathematics: Logic, Quantity, and Method," *The Review of Economics and Statistics* 36, no. 4: 357-386.
- Oates, Wallace E., 1998. *The Economics of Fiscal Federalism and Local Finance*. Northampton, MA: Edward Elgar.
- _____, 1969. "The Effect of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis," *The Journal of Political Economy* 77, no. 6: 957-971.
- _____, 2006. "The Many Faces of the Tiebout Model." in *The Tiebout Model at Fifty: Essays in Public Economics in Honor of Wallace Oates*. Cambridge, MA: Lincoln Institute of Land Policy.
- Ostrom, Vincent and Elinor Ostrom, 1965. "A Behavioral Approach to the Study of Intergovernmental Relations," *The Annals of the American Academy of Political and Social Science* 359, no. 1: 137-146.
- Ostrom, Vincent, Charles Tiebout, and Robert Warren, 1961. "The Organization of Government in Metropolitan Areas: A Theoretical Inquiry," *The American Political Science Review* 55, no. 4: 831-842.
- Peterson, Richard and Charles M. Tiebout, 1964. "Measuring the Impact of Regional Defense-Space Expenditures," *The Review of Economics and Statistics* 46: 421-429.
- Pickhardt, Michael, 2006. "Fifty Years After Samuelson's 'The Pure Theory of Public Expenditure': What Are We Left With?" *Journal of the History of Economic Thought* 28, no. 4: 439-460.
- Samuelson, Paul, 2008. "Affectionate Reminiscences of Richard Musgrave," *FinanzArchiv / Public Finance Analysis* 64, no. 2: 166-168.
- _____, 1958. "Aspects of Public Expenditure Theories," *The Review of Economics and Statistics* 40, no. 4: 332-338.
- _____, 1955. "Diagrammatic Exposition of a Theory of Public Expenditure," *The Review of Economics and Statistics* 37, no. 4: 350-356.
- _____, 1954. "The Pure Theory of Public Expenditure," *The Review of Economics and Statistics* 36, no. 4: 387-389.

- _____, 1956. "Social Indifference Curves," *The Quarterly Journal of Economics* 70, no. 1: 1-22.
- Scotchmer, Suzanne, 1994. "Public Goods and the Invisible Hand," in *Modern Public Finance*, eds. John M. Quigley and Eugene Smolensky. Cambridge, MA: Harvard University Press: 93-119.
- Stolper, Wolfgang F., and Charles M. Tiebout, 1978. "The Balance of Payments of a Small Area as an Analytical Tool," *The Analysis of Regional Structure: Essays in Honour of August Lösch, Karlsruhe Papers in Regional Science* 2: 92-109.
- Sturn, Richard, 2010. "'Public Goods' Before Samuelson: Interwar Finanzwissenschaft and Musgrave's Synthesis," *The European Journal of the History of Economic Thought* 17, no. 2: 279-312.
- Tiebout, Charles, 1961. "An Economic Theory of Fiscal Decentralization," in *Public Finances: Needs, Sources, and Utilization*, ed. James Buchanan. Princeton, NJ: Princeton University Press: 79-96.
- _____, 1950. "Employment in the Summer Vacation Business in Connecticut," *Connecticut Labor Department Monthly Bulletin*: July, 1-11.
- _____, 1957. "Location Theory, Empirical Evidence and Economic Evolution," *Regional Science Association Papers and Proceedings* 3: 74-86.
- _____, 1956. "A Pure Theory of Local Expenditures," *The Journal of Political Economy* 64, no. 5: 416-424.
- Warren, Robert, 1964. "A Municipal-Services Market of Metropolitan Organization," *Journal of the American Institute of Planners* 30, no. 3: 193-204.