

RESEARCH ARTICLE

Commemorating Oliver Williamson, a founding father of transaction cost economics

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(Received 10 January 2021; revised 3 July 2021; accepted 5 July 2021; first published online 2 August 2021)

Abstract

This contribution commemorates Oliver Williamson, who recently passed away, as one of the founding fathers of Transaction Cost Economics (TCE). It does so by touching on some of the details of his personal life and connecting these with his professional career. The latter was devoted to putting the study of institutions on the economic agenda. Closer scrutiny reveals that three phases may be identified. Williamson first developed an interest in analysing vertical integration. During the second phase, he elaborated this interest in TCE, and during the third, he positioned his contributions within the area of institutional economics. Furthermore, the article considers the various influences of institutional and organizational economists on Williamson. Finally, the article considers the reception, criticism, and further elaborations of Williamson's contributions.

Key words: Institutional economics; new institutional economics; Oliver Williamson; organizational economics; transaction cost economics

1. Introduction

Why do firms exist? Could they be more than just a 'black box' that transforms inputs into outputs? Oliver Williamson (1932–2020) became fascinated with this puzzle in the 1960s. He was inspired to do so by Nobel Laureate Ronald Coase, who was the first to introduce the concept of transaction costs (Coase, 1937; Williamson, 1971, 1973, 1975, 1979). Subsequently, Williamson became one of the foremost contributors to the operationalization of Transaction Cost Economics (TCE) (Geyskens *et al.*, 2006; Hodgson and Gindis, 2007; Pessali, 2006; Shelanski and Klein, 1995; Whinston, 2001).

From the beginning, TCE has been part of New Institutional Economics (NIE), a term that Williamson coined in his well-known 'Markets and Hierarchies' (Williamson, 1975). TCE regards the transaction as the ultimate unit of activity, and views governance as an economizing response to transaction costs. Transaction costs manifest themselves in various ways. Williamson defined these as the costs of running an economic system of companies, explicitly different from production costs. TCE then evolves around the question of whether a firm should make its own inputs, or buy them on the market. This is called the make or buy decision. For each transaction, decision-makers aim to identify the organizational structure that minimizes transaction costs. Markets and hierarchies (firms) are the polar modes, hybrids fall in between.

In this article, we commemorate the work of Nobel Laureate Oliver Williamson. In the next section, we identify three different phases in his career. In the process, we shed light on the progression in his insights and elaborate his contributions to TCE and NIE. Subsequently, we discuss the institutional and organizational economists who were most influential in inspiring Williamson. Thereafter, we

analyse the reception and criticism of his work and highlight promising directions for future research. The final section concludes.

2. Life, career, and academic contributions

Oliver Eaton Williamson, to family and friends known as Olly, was born in an intellectual family in Superior, Wisconsin (USA) on 27 September 1932. He was the second child of Scott and Lucille Williamson, who were both high school teachers in a small rural town before they married. As a child, Williamson wanted to become a lawyer, but once he learned math and science during high school, his aspiration changed. Upon the recommendation of his mother, Williamson started his bachelor's in management at Ripon College in a dual-degree program with the Massachusetts Institute of Technology. Williamson later explained that his studies in engineering provided him with a receptive attitude towards transaction costs (Williamson, 2010a). Upon graduating in 1955, Williamson started his first job as a project engineer for General Electric. He soon moved to the Central Intelligence Agency in Washington, D.C., where he met and married his wife Dolores Celini in 1957. Together they had five children and five grandchildren to date. The two frequently hosted dinners for the doctoral students that Williamson mentored. Williamson loved to spend time with his family, especially during summers at Lake Wisconsin, where he enjoyed metal sculpting, and went swimming, sailing, water skiing, and canoeing. Williamson remained close to his friends from high school and university throughout his life, and he liked to play tennis, golf, and bridge.

Williamson obtained his MBA at Stanford University in 1960, and his PhD in economics and organization theory at Carnegie Tech¹ in 1963. He worked at the University of California in Berkeley for most of his academic career. Williamson loved to teach across disciplines and taught various courses in economics, business, and law. Williamson was known to be gentle in his critique, modest in his fame, and good in his humour. He particularly enjoyed working on the continuum between markets and hierarchies, defining the characteristics of hybrid modes, and considered himself privileged to have been part of the discussion on the design of vertical integration guidelines (Hodgson and Gindis, 2007). Though a shy person, he helped colleagues with their work by asking good questions, being patient, empathic, and generous with his insights. Williamson regarded the economics of organization as an exciting field of research, and said he was satisfied that he could contribute to it (Hodgson and Gindis, 2007). He was also known as a helpful mentor who spent time with his students. Not surprisingly therefore, he always aimed to provide his students with lasting benefits and the 'realization that economic organization is more complicated, less orderly, and more interesting than they had previously imagined' (Williamson, 2003: 918–919). Rather than pronouncing '[t]his is the law here', Williamson preferred to confront his students with the question '[w]hat's going on here?' (Williamson, 2010b: 676). He was inspired to do so by what he named the 'Carnegie Triple' by which he meant: 'be disciplined, be interdisciplinary, and have an active mind' (Williamson, 1996a: 25). He continued to work in line with this Carnegie Triple throughout his life. In the remainder of this section, we identify and discuss three different phases in Williamson's career, starting with his enrolment in Stanford's MBA program.

2.1 Phase 1: early career (1958–1971)

Williamson started his MBA at the Stanford Graduate School of Business in 1958. During the classes of James Howell, Williamson became intrigued with economics and discovered that it uses much of the analytical apparatus of engineering. Howell advised Williamson to take classes with Nobel Laureate Kenneth Arrow. The latter further inspired Williamson to study economics. Later, Arrow would remember Williamson as a forever curious student who asked good questions about how things

¹The Carnegie Institute of Technology, known as 'Carnegie Tech', merged with the Mellon Institute in 1967, to become known as Carnegie Mellon University.

worked, and did not work (Williamson, 2010a). We elaborate the intellectual influence of Arrow on Williamson in the next section.

Upon obtaining his MBA in 1960, Williamson was awarded a three-year fellowship by the Ford Foundation to pursue his graduate studies. Williamson learned about an interdisciplinary program at Carnegie Tech and decided to switch from Stanford to Carnegie, and from business to economics and organization theory. To be sure, organization theory is not a separate social science, but a separate field that joins economics, sociology, political science, and aspects of cognitive and social psychology (Williamson, 2003). Williamson enjoyed the intellectual excitement at Carnegie, as his 'understanding of and approach to the study of economic organization underwent a vast and permanent change' (Williamson, 2003: 918). He particularly considered the interdisciplinarity of the program to be useful: 'The fact that I have found the alliance of law, economic, and organization so productive is partly because, as a student of Carnegie, it could hardly be otherwise' (Williamson, 1996a, 1996b: 25). With his dissertation, entitled 'The Economics of Discretionary Behaviour: Managerial Objectives in a Theory of the Firm', Williamson won the Ford Foundation dissertation competition and obtained his PhD in 1963.

That same year, Williamson started his academic career in the Economics Department at the University of California at Berkeley in the field of industrial organization. Williamson subsequently moved to the University of Pennsylvania (UPenn) where he worked as an associate professor from 1965 to 1968 and as a professor from 1968 to 1983. In between (from 1966 to 1967), Williamson took on the position of Special Economic Assistant to the Head of the Antitrust Division of the U.S. Department of Justice. There he was asked to focus on the analysis of prospective cases, amongst which cases of vertical integration. He would later describe this as a defining event in his life, since it inspired him to study the topic of vertical integration (Williamson, 2010a). At the time, economists were preoccupied with the monopoly problem (Coase, 1972: 67) and regarded all non-standard forms of contract and organization, as deviations from simple market exchange, to be suspect (Williamson and Winter, 1993). Williamson on the other hand found the arguments for the anti-competitiveness of vertical integration to be unclear, truncated, and defective (Williamson, 2009).

Once back at UPenn, Williamson could not let go of the issue. Inspired by his interdisciplinary training at Carnegie, he sought to combine economics and organization theory to understand firm and market organization in the real world. At the time, however, firms were merely regarded as production functions that transformed inputs into outputs according to the laws of technology. Since transaction costs were assumed to be zero, neoclassical economics saw no reason for integration besides monopoly power and neglected the properties of internal *versus* market coordination. As such the literature on the topic was scarce.

Nevertheless, one of the economists who did stress the importance of organizations was John R. Commons, one of the leading institutional economists of the first half of the 20th century (Commons, 1924; Hodgson and Stoelhorst, 2014; Williamson, 2010b). According to Commons, governance is an instrument to accomplish order in an incomplete contracting relation where potential conflict and asymmetric information threaten to undo or upset opportunities to realize mutual gains. Williamson adopted this line of thinking. More specifically, Williamson took over the focus on the transactions to which Commons had called attention, namely those for which continuity of the exchange relation is of special importance (Williamson, 2003, 2010b). Furthermore, Williamson took the focus on contracts from Chester Barnard (Barnard, 1938; Williamson, 2003). More specifically, the distinction between informal and formal dimensions of organization goes back to Barnard (Hodgson and Gindis, 2007). Williamson further built on Coase's 'The Nature of The Firm' (Coase, 1937) as well as Arrow's review of market *versus* non-market allocation (Arrow, 1969). As noted earlier, we elaborate the influences of Coase and Arrow on Williamson's thinking in the next section.

In addition, Williamson studied multiple dialogues between antitrust scholars on the purposes and methods of antitrust policies (Blake and Jones, 1965a, 1965b; Bork, 1965; Bork and Bowman, 1965). This led him to conclude that a relevant economic model was needed that could assess the effects of mergers, in order to permit courts and enforcement agencies to make more precise evaluations. He

published his analysis in ‘Economies as an Antitrust Defense: The Welfare Tradeoffs’ (Williamson, 1968). With it, Williamson made a first step in the direction of an economic model, and showed that mergers may lead to economic efficiency gains from which society could benefit, even if the increased market power leads to a higher price. To learn more about the literature on vertical integration and vertical market restrictions, Williamson organized a seminar at the University of Pennsylvania. He wanted to find other work that would better suit his needs, but in general, he was disappointed (Hodgson and Gindis, 2007). For much of the literature turned out to apply welfare economics, and appealed to hypothetical ideas rather than to real-world choices and their consequences for firms. Williamson subsequently combined economics and organization theory to re-examine these issues in a more productive way. The paper that resulted was ‘The Vertical Integration of Production: Market Failure Considerations’ (Williamson, 1971), which may be seen as the capstone for Williamson’s early interest in vertical integration. Subsequently, his horizon broadened.

2.2 Phase 2: the start of transaction cost economics (1971–1983)

At the time, new applications began to develop. Property rights theories and agency theory were taking shape. As Williamson later explained: ‘[a]n “economics of organization” was in the air. What to make of this cornucopia of theories and which to choose?’ (Hodgson and Gindis, 2007: 374). Williamson realized that his 1971 analysis was not restricted to vertical integration alone. What rested for him was the exercise of operationalization, for which he applied his mantra: ‘first, keep it simple; second, get it right; third, make it plausible; fourth, make predictions and engage in empirical testing to see how the theory corresponds with real world experience. ... Of these four, prediction and empirical testing constitute the cutting edge’ (Hodgson and Gindis, 2007: 374). This he did. What started as a standalone effort to analyse vertical integration in 1971, became a highly-cited article, and most notably, turned out to be the start of TCE (Williamson, 2010b).

With his 1971 article, Williamson went against the prevailing orthodoxy in economics once he showed that firms have specific incentive and control properties in relation to markets. Although the neoclassical idea of the firm as a production function was useful for many purposes, ‘a broader a priori case for the vertical integration of production exists than is commonly acknowledged’ (Williamson, 1971: 122). Therefore, a richer conception of firm and market organization was needed for transaction cost theory to develop further. The next step for Williamson was hence to operationalize the key factors that determine whether transactions will be structured within markets or within hierarchies (firms).

In his signature article and subsequent book ‘Markets and Hierarchies’ (Williamson, 1973, 1975), Williamson developed a framework using transaction costs to explain the existence of these two polar modes of governance structures. Markets and hierarchies are distinguished by different coordinating and control mechanisms, as well as different abilities to adapt to disturbances. Transactions will take place within the firm when market transactions are not beneficial. Williamson later noted that this was the obvious way to start (Williamson, 2010a). Interestingly, Williamson opened with ‘in the beginning there were markets’ (Williamson, 1975). He did so for expositional convenience necessitated by the fact that comparative analysis required him to set up one form before he could discuss another. Because neoclassical economics focused on markets (that is the ‘in the beginning part’), and the existence of firms was the ‘mystery’, it was natural to begin by discussing markets before taking up the firm (as Coase did before him).

In a nutshell, Williamson theorized as follows.² Based on the conjunction of a set of human attributes with a related set of transactional factors, either the market or the hierarchy will arise as

²Williamson obviously wrote elaborately on transaction cost theory. We only provide a brief description of the main concepts here as it is not the role of this paper to explain the complexities of such an extraordinarily rich contribution. For a more detailed explanation, see, for instance, Williamson (1973, 1975, 2005, 2010b).

the optimal governance structure. The human factors that Williamson distinguished were bounded rationality and opportunism. Bounded rationality refers to the rate and capacities of individuals to receive, store, retrieve, and process information without error. Opportunism refers to strategic behaviour aimed at redistributing surpluses, also defined by Williamson as self-interest seeking with guile. Whether markets experience contractual problems as a result of these two depends on the principal dimensions that characterize transactions, which are the frequency of exchange, asset specificity, and uncertainty. First, the frequency of exchange is the frequency with which the transaction occurs between different parties, which can be one-time, occasional or recurrent. The higher the frequency of exchange, the more likely a hierarchy mode will arise. This is because, in general, it is easier for hierarchies to recover the cost of governance when transactions are large and of a recurring kind. Second, asset specificity refers to the degree to which investments have a significantly lower value in their next best alternative use (or with the next best user). Williamson distinguished site, physical, and human asset specificity. When an asset is relationship-specific, its market value is lower outside of the transaction. Third, transactions vary with respect to their complexity and the degree of uncertainty about the future and about other parties' actions. The higher the uncertainty, the higher the transaction costs such as supervision or bargaining costs.

A certain degree of bounded rationality and opportunism, coupled with a certain type of frequency of exchange, asset specificity, and uncertainty, will give rise to a certain economic governance structure. More precisely, market governance structures tend to arise for non-specific transactions of occasional and recurrent frequency. Markets fail, however, when specific transactions occur in environments with a high degree of uncertainty, with a small number of potential partners, and where opportunism cannot be controlled. In that case, hierarchical governance structures tend to arise. This alternative to the market protects parties against opportunism by their opposites. In addition, Williamson's view was that what distinguished firms from markets is their inability to use (conventional) contracts to enforce agreements among units of a firm. Whereas markets have legalistic contract law, which prescribes courts as the forum of ultimate appeal, the basic law of internal organization is forbearance. Disputes between internal divisions of one firm over identical technical issues must be resolved by the parties internally. As a result, internal organization becomes its own court of ultimate appeal.

2.3 Phase 3: further development and late career (1983–2020)

In 1983, Williamson joined the Economics Department at Yale. He organized workshops on law and organization at the Law School, and on economics and organization at the School of Organization and Management. In 1988, he returned to Berkeley because he preferred to teach across disciplines. Between 1995 and 1996, he served as the Chair of the Academic Senate at Berkeley, a position he would later regard as demanding but fulfilling. Williamson further developed TCE, which remained his main focus throughout the rest of his academic life. For instance, he extended the lessons of TCE to public and private bureaucracies (Williamson, 1999).

During his time in Berkeley, he created a new field in the Economics of Institutions in the Economics Department, and reshaped the Business and Public Policy curriculum of the Haas School. He described both as rewarding, being surrounded by inspiring colleagues and students (Williamson, 2010a). In 1997, the Society for Institutional and Organizational Economics³ was founded with the purpose of deepening the understanding of organizations and institutions. The society was launched by a letter signed by Coase and North inviting like-minded economists to its first meeting at Washington University in St. Louis in 1997. Williamson attended that meeting and subsequently agreed to be part of the board of directors. Later he became the third president after Coase and

³The Society for Institutional and Organizational Economics (SIOE) was originally founded as *The International Society for New Institutional Economics*. This was shortly after the first conference at Washington University in Saint Louis in September 1997. On 19 June 2015, the Society changed its name to SIOE.

North. Williamson also served as a founding editor of the *Journal of Law, Economics, and Organization*. After having distinguished between markets and hierarchies, William subsequently moved towards considering intermediate, hybrid modes of contracting (Hodgson and Gindis, 2007). These include various forms of long-term contracting, reciprocal trading, regulation, franchising, and the like (Williamson, 1991). More specifically, the hybrid mode is characterized by semi-strong incentives, intermediate contractual safeguards and administrative controls, and works out of a semi-legalistic contract law regime.

Next to his focus on TCE, Williamson examined in two articles what the institutional environment entails more broadly (Williamson, 1998, 2000). In these, Williamson sketched a figure of four levels of social analysis, including the levels two and three of NIE that he explicitly named as such. A higher level in the model thereby imposes constraints on the level immediately below. The top level is the social embeddedness level, taken as given by most economists. The informal institutions at this level change very slowly. The second level is the institutional environment that includes the formal rules of the game within which economic activity is organized. The third level is where the institutions of governance are located and deals with the play of the game. This is the level at which TCE operates. Finally, level four is the level with which neoclassical economics and agency theory are concerned, and is about resource allocation and employment, prices and output. We return to the reception and criticism of these insights in section four. Besides the figure and the text in the 1998 and 2000 articles, however, Williamson rarely dealt with the broader context of NIE explicitly. At the same time, his work on, for instance, bureaucracy, regulation, contract law, and antitrust can be considered analysis of institutions at that second level.

Over the course of his distinguished career, Williamson received multiple honorary doctorates from universities around the world. Furthermore, he was elected fellow of the Econometric Society in 1977, fellow of the American Academy of Arts and Sciences in 1983, member of the National Academy of Sciences in 1994, fellow of the American Academy of Political and Social Science in 1997, and distinguished fellow of the American Economic Association in 2007. In addition, the Haas School of Business at Berkeley established the Williamson Award in his name, its highest faculty honour.

Williamson remained at Berkeley and taught economics and law until his retirement in 2004. By the time Williamson retired, both TCE and NIE were in wide use. Also after his retirement, he remained active in research, presented in workshops, and participated in recruiting and fund raising. In 2009, Williamson was awarded the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. He shared it with political scientist Elinor Ostrom, the first woman to receive the Prize, who wrote on common pool resources and discussed how institutions could manage ‘The tragedy of the commons’. Williamson received the Nobel for his analysis of economic governance, particularly his theory of why economic transactions take place within or between firms. He gifted half of the 1.4 million USD Prize money to the Haas School of Business at Berkeley, to create a new endowed faculty chair in the economics of organization. Williamson passed away on 21 May 2020, at the age of 87.

3. Influences on Williamson: standing on the shoulders of four giants

Williamson has been inspired by several influential institutional and organizational economists throughout his academic life, as mentioned several times in the previous section. Williamson met most of these at Carnegie when he joined a small group of young researchers in the Graduate School of Industrial Administration, seven of whom have since been awarded Nobel Prizes in Economics (Williamson, 2010a). He clearly had high regard for Richard Cyert, who played a role in exposing Williamson to organizations as a subject of study. Cyert taught Williamson on the behavioural theory of the firm, and became one of Williamson’s mentors (Ménard and Shirley, 2014). When Williamson was in his last semester at Carnegie, the two taught a course together on the Behavioural Theory of the Firm (Williamson, 1996b). Together with James March, Cyert argued that agents within an organization pursue divergent goals and can achieve a resolution of conflicts through bargaining (Cyert and March, 1963). March, Herbert Simon, Cyert, and others at Carnegie opened doors to

the development of economic theory towards a richer conception of the firm and market organization, examining firms in more operationally engaging ways (Williamson, 1996b).

Williamson later explained that the ‘astonishing thing about Carnegie is that it joined two very fundamental and seemingly incompatible strands of research’ (Williamson, 1996b: 150). On the one hand, Cyert, Simon, and March dealt with bounded rationality, organizational theory, and behavioural economics. On the other hand, economists such as Franco Modigliani, John Muth, Merton Miller, and Allan Meltzer focused on rational expectations and efficient markets. This second group was later joined by Edward Prescott, Robert Lucas, who arrived as Williamson was graduating, and Thomas Sargent, who was Williamson’s first research assistant (Williamson, 1996b). Balancing these perspectives, Williamson found his niche: the combination of economics and organization theory.

While the influence of Barnard and Commons was covered already, we highlight four economists that had the greatest intellectual influence on Williamson in this section. We discuss, in order of birthyear, Friedrich Hayek, Ronald Coase, Herbert Simon, and Kenneth Arrow.

3.1 Friedrich Hayek (1899–1992)

‘The marvels of the market to which Hayek referred in 1945 apply equally today’ (Williamson, 1985: 86).

Whereas Williamson was inspired by Barnard in his analysis of hierarchies, he borrowed from Hayek’s contributions in his insights on markets. While the former looked at consciously coordinated adaptations accomplished through the use of management within the firm, the latter considered autonomous adaptations accomplished in the market. Indeed, both saw adaptation as the central problem of economic organization, but stressed alternative modes of governance. On the one hand, Barnard analysed how coordination occurs in a conscious, deliberate, and purposeful way with the use of administration. On the other hand, Hayek elaborated how the price system functions as a mechanism for communicating information thereby allowing economic actors to adjust spontaneously to changes in the market. Instead of celebrating the marvel of hierarchy with Barnard or the marvel of the market with Hayek, Williamson stressed the importance of understanding and appreciating both hierarchies and markets. Seeing firms as governance structures, as opposed to production functions, Williamson described the market as an organizational alternative (Williamson, 2005: 4).

Overall, Williamson draws on Hayek mostly for Hayek’s views that attention is a scarce resource and adaption is a central problem of organization.

3.2 Ronald Coase (1910–2013)

‘We have every reason to celebrate Coase’s intellectual leadership and the course of events that he set in motion. George Stigler once distinguished between BC and AC, where BC refers to ‘before Coase’ and AC refers to ‘after Coase’. ... No one would dispute that economics would be impoverished were it not that Coase appeared on the scene and had the insights, aptitude and courage to contest orthodoxy. ... It has been my pleasure to have had the benefit of Coase’s research’ (Williamson, 2015: 225–226).

Reading this quote, one is not surprised that Williamson recognized Nobel Laureate Ronald Coase as a great institutional economist and wonderful institution builder (Williamson and Winter, 1993). Coase was the first to introduce and clarify the concept of transaction costs explicitly⁴, as the ‘costs of using

⁴Coase explicitly introduced the concept, but other economists already hinted at the idea. Without diminishing the contribution of Coase, Francis Edgeworth, who in discussing the indeterminateness of outcomes in bilateral exchange, remarks, ‘[a]n necessary evil of indeterminate contract is the tendency, greater than in a full market, towards dissimulation and objectionable acts of higgling’ (Edgeworth, 1881: 29–30). Also, Thorstein Veblen already hinted at the idea of transaction costs in his ‘Theory of Business Enterprise’ (Veblen, 1904), before Coase and Williamson did so.

the price mechanism'. His 'The Nature of the Firm' changed the way economists think about economic organization. Going against neoclassical economic theory that studied price and output mechanisms of firms but ignored the organization because transaction costs were assumed to be zero, Coase argued that the costs of operating competitive markets were in fact positive.

Nonetheless, Coase's 'The Nature of the Firm' (Coase, 1937) was first 'much cited but little used' (Coase, 1972: 63). As Williamson explained, although 'the seeds of transaction cost economics were planted by Coase in 1937' (Williamson, 2003: 938), it took until the early 1970s before those seeds began to germinate and transaction cost as formal theory started. Recognition of the importance of transaction costs accelerated with the publication of Coase's 'The Problem of Social Cost' that focused on the issue of externalities⁵ (Coase, 1960). The 1960 article was an immediate success, soon cited and extensively discussed (Coase, 1993). Coase's 'The Nature of the Firm' was subsequently (re-)examined by economists when Williamson published 'Markets and Hierarchies' (Williamson, 1975) and 'Economic Institutions of Capitalism' (Williamson, 1985).

In short, Coase exerted great influence on the thinking and contributions of Williamson because of his pioneering work on transaction costs and property rights. At the same time, the work of Williamson is significantly different from that of Coase. That is to say, Coase did not operationalize a theory of transaction costs, nor developed a conceptual framework from which predictions could be derived and empirically tested. Yet it was never the intention of Coase to develop an analysis that could be used in the study of industrial organization in a systematic manner. As Coase later explained in retrospect: 'I think it may well be that the most important contribution of 'The Nature of the Firm' to economics will be considered to have been the explicit introduction of the concept of transaction costs into economic analysis but it was not my aim to change the character of economic theory' (Coase, 1993: 62)⁶. Williamson, on the other hand, did aim to transform the discipline of economics, purposefully and thoughtfully. He intended and succeeded to contribute to the development of a comprehensive theory on transaction costs and vertical integration.

3.3 Herbert Simon (1916–2001)

'I worked mainly with the behavioral economics group at Carnegie. Bounded rationality - which Simon (1957) defined as behavior that was intendedly rational but only limitedly so - seemed to me, then and since, as a useful way to go' (Williamson, 1996b: 150).

Nobel Laureate Herbert Simon is known for his pioneering ideas on bounded rationality and his role in the establishment of old behavioural economics for his research on decision-making processes within economic organizations (Sent, 2004). Simon was part of a research group at Carnegie that studied bounded rationality, satisficing, and simulation, which also included Richard Cyert and James March. This group of scholars played an important role for Williamson, since they argued that organization theory should both inform, and be informed, by economics (Williamson, 2010b). Most notably, Simon examined to what extent people make decisions in a rational way, and argued that organizations are a solution to people's bounded rationality. He felt that neoclassical economists were not serious about describing the formal foundations of rationality (Sent, 1997). Williamson, and with him TCE, adopted Simon's insight that alternative modes of organization differ in discrete structural ways (Hodgson and Gindis, 2007).

⁵The 1960 article discusses the firm only in the context of summarizing Coase's (1937) arguments and adds nothing new specifically to the question of firm boundaries.

⁶Here Coase explains he did not even contemplate changing economic analysis in the 1930s. This matters because Coase is implying something about his character; had he aimed to change economic analysis he might well have done so, even in his twenties: 'given that the ideas in the article were developed by a young man who knew virtually no economics it is inconceivable that he would have had any such aim in mind' (Coase, 1993: 62). Note that at least by the 1990s and probably earlier, Coase had made it his goal to change economics.

Simon himself was inspired by the concept of ‘limited rationality’ as elaborated by Commons and Barnard, who respectively spoke of ‘limiting factors’ and ‘strategic factors’ (Klaes and Sent, 2005). Simon subsequently coined the term ‘bounded rationality’ in 1957. His major contribution to the economics of organization, as well as to organization theory, is the argument that ‘it is precisely in the realm where human behavior is intendedly rational, but only limitedly so, that there is room for a genuine theory of organization and administration’ (Simon, 1957). Williamson used the concept of bounded rationality in *Markets and Hierarchies* as a source of contractual incompleteness. He used it as a key factor that affected economic organization, together with opportunism and atmosphere (Williamson, 1973, 1975). Williamson was aware that he had to deal with the matter of rationality with extreme care in the early stages of TCE (Pessali, 2006). Nonetheless, all three of the early Williamson works copiously cited Simon and listed rationality explicitly as a key factor affecting economic organization, confronting mainstream economists with the concept.

According to Williamson, people with bounded cognitive abilities will not have all the necessary information to anticipate relevant contingencies when matters are complicated and when the intended contract is long. Yet, bounded rationality in and of itself is not much of a concern if the transactions in question are uncomplicated and hardly experience uncertainty. Once coupled with opportunism, however, people may exploit the bounded rationality of others in a strategic way. As such, bounded rationality and opportunism together create a need for economic organization (Williamson, 1973). After Williamson linked the idea of conflict of interest with that of information limitations, bounded rationality gained a prominent role in TCE (Klaes and Sent, 2005). For quite some time, Williamson and Simon remained in disagreement on the appropriate trade-offs between realism and comprehension in economic theory, as well as on the extent to which the theory should be based on realistic behavioural assumptions. Eventually, Simon expressed his appreciation of Williamson’s work (Augier and March, 2008).

3.4 Kenneth Arrow (1921–2017)

‘What is less widely remarked is that Arrow’s contributions to the study of complex economic organization have been very influential in helping to shape the New Institutional Economics (NIE)’ (Williamson, 1987: 584).

As noted earlier, Williamson attended Arrow’s classes, was inspired to study economics as a result, and took the distinction between market and non-market allocation from Arrow. While the Arrow-Debreu model of general equilibrium presumed zero transaction cost, Arrow’s analysis of market failure did call for an analysis of transaction costs: ‘[M]arket failure is not absolute; it is better to consider a broader category, that of transaction costs, which in general impede and in particular cases completely block the formation of markets’ (Arrow, 1969: 48). In Arrow’s analysis, market failure is an organizational phenomenon that has ramifications for vertical integration: ‘An incentive for vertical integration is replacement of the costs of buying and selling on the market by the costs of intra-firm transfers; the existence of vertical integration may suggest that the costs of operating competitive markets are not zero, as is usually assumed by our theoretical analysis’ (Arrow, 1969: 48). This resonated with Williamson’s early interest in vertical integration.

More specifically, Williamson (1987) considers five areas that were influenced by Arrow’s contributions. First, Arrow stressed that institutions matter, for they have profound efficiency ramifications. Second, he stressed the rational interpretation of economic organization. Third, Arrow studied information processing as well as incentive and control differences. For instance, information asymmetry is responsible for many of the more serious problems of economic organization. Fourth, as noted above, he stressed transaction costs as the costs of running the economic system. Finally, he acknowledged both bounded rationality and opportunism in the form of moral hazard. Williamson (1987) concluded on Arrow’s influence: ‘His important and continuing contribution to NIE place us greatly in his debt’ (596). Arrow’s influence on NIE was exerted largely through Williamson, from the start of the latter’s career.

4. Reception, criticism, and future directions

Williamson's work has stimulated debate and further work along the lines of the building blocks of NIE, i.e. transaction costs, property rights, and contracts (Ménard and Shirley, 2014). After the 'old' institutional economics failed to influence mainstream economics, Williamson and others returned the study of institutions to the economic agenda (Hodgson and Stoelhorst, 2014). In fact, Williamson has been accused of strengthening neoclassical economics and supporting capitalism (Ankarloo and Palermo, 2004).

4.1 Reception

The work of Williamson currently spawns thousands of applications across disciplines, far beyond the study of firms and markets. The result is a large number of citations to his work, ranking above economists such as North, Marx, and Keynes (Pessali, 2006).

TCE theory has seen applications across political science, management, law, sociology, and anthropology, as well as in the fields of public finance, comparative economic systems, and economic development and reform (Williamson, 2010b). Furthermore, TCE had numerous applications to public policy in relation to business, including topics such as antitrust, regulation, and corporate governance. For instance, Williamson's thinking stimulated debate on vertical integration and led judges and antitrust officials to be less hostile to vertical integration. Williamson also contributed to the domain of non-market strategy, important to managers and analysts (De Figueiredo, 2010). Furthermore, TCE theory has been tested empirically in a variety of disciplines and has 'witnessed a veritable explosion of research efforts' in breadth and depth (Geyskens *et al.*, 2006: 519). As a consequence, the main insights and predictions of TCE have become increasingly accepted, in particular the importance of governing transactions (Shelanski and Klein, 1995).

4.2 Criticism

Since its emergence, there has been intense debate on NIE and in particular on Williamson's TCE approach, much of which among scholars generally sympathetic to the approach (Foss and Klein, 2010). According to them, TCE neglects differential capabilities and dynamics. It fails to pay attention to the progress economists and management scholars have made on the knowledge-based and evolutionary perspective. Also, there has been much debate on the role of bounded rationality in the theory of the firm. Moreover, TCE has been criticized for not being fully formalized. In response, Williamson explains that premature formalization is not desirable as it runs the risk of becoming disconnected from the phenomena (Williamson, 2010a).

In particular, opportunism has come under attack not only for being empirically inaccurate but also for not being a necessary assumption in the theory of the firm (Conner and Prahalad, 1996). For instance, Hodgson (2004) shows that there are more reasons for the existence of governance structures than just opportunism, namely misinterpretation, misunderstanding, and disagreement. Indeed, Williamson himself recognized the controversial character of the proposition that economic agents are opportunistic (Williamson, 1993).

Also, critics have found fault with Williamson's (2000) levels of analysis. While he argued the lowest level to be the domain of sociologists, many economists have (subsequently) focused on this level of informal institutions, culture, social norms, etc. (Greif, 1993, 2006; North, 1990, 2005; North *et al.*, 2009). More recently, research focusing on this level has become a growth area in economics. Think of the two-way causal effect between culture and institutions (Alesina and Giuliano, 2015) or the interplay between cognitive rules, institutions, and economic growth (Greif and Mokyr, 2017). Moreover, empirical studies have moved beyond testing whether history matters and now attempt to identify why institutions, culture, knowledge, and technology matters (Nunn, 2009). This research also shows that while some level 1 institutions fit Williamson's description of them

as embedded and only changing over hundreds or thousands of years, others change rapidly, and this brings us to a brief description of the future directions that Williamson himself envisioned.

4.3 Future directions

In 'The Mechanisms of Governance' (Williamson, 1996a) and 'The New Institutional Economics: Taking Stock, Looking Ahead' (Williamson, 2000), Williamson himself stated that although the past quarter century has witnessed enormous progress in the study of institutions, we are still very ignorant about them. The main reason for this is that institutions are very complex. Moreover, neoclassical economics has been dismissive of institutions, and much of organization theory lacked scientific ambition. Awaiting a unified theory, Williamson recommended we should be accepting of pluralism (Williamson, 2000). He expected NIE to go beyond the accustomed limits of standard economics and seek partnerships across law, organization theory, sociology, evolutionary psychology, and cognitive anthropology (Williamson, 2015).

While applauding the extensive empirical analysis and applications of his insights within business, economics, social sciences, and public policy, Williamson (2010b) recommended the development of a fully formal framework. He described the papers by Stanford Grossman, Oliver Hart, and John Moore (Grossman and Hart, 1986; Hart and Moore, 1990) as pathbreaking in this respect. While he appreciated their efforts to develop models incorporating incomplete contracts (which earlier agency models did not) and a role for vertical integration, he criticized them for ignoring the ex-post costs of adaptation. Hence, Williamson argued that more work remains to be done in this area.

5. Concluding comments

As one of the founding fathers of NIE, Oliver Williamson has had a lasting impact on a wide range of academic disciplines and will most likely continue to inspire new research. He brought institutions on the research agenda by elaborating the role of transaction costs. As the brilliant academic that he was, he remained forever curious about the economics of organization and enjoyed working on the continuum between markets and hierarchies.

Williamson (2010b) himself described the history and future of TCE in the spirit of Kuhn (1970). In this light, the informal stage of TCE started in the 1930s, when Coase and Commons challenged the then standard practice and argued that firm and market organization should be analysed rather than taken as given. Transaction cost was the missing concept. Errors and omissions in the neoclassical set-up were described but new concepts were not yet worked out. Subsequently, in the 1970s, the pre-formal stage started when scholars developed new concepts to reinterpret economic phenomena such as vertical integration, vertical market restrictions, and labour market organization. What followed was the semi-formal stage of TCE that started in the 1980s and is still in progress. During this stage, scholars deal with concepts such as credible contracting and hybrid modes. This stage also includes extensive empirical applications within a wide variety of domains.

Acknowledgements. Acknowledging the various limitations and challenges, Williamson encouraged the new generation of scholars: 'So let's push the boundaries' (Hodgson and Gindis, 2007: 385).

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