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Yoram Barzel: commemorating the life of an institutional economist

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Abstract

Yoram Barzel was a Chicago trained price theorist who became a foundational contributor to the literature on property rights and transaction costs. In this commemoration I outline the academic path he took, but then concentrate on the set of transformative ideas he had that led to ‘the theory of economic property rights’. It was Yoram’s belief that such a theory is the ground floor for the study of the organization of economic activity, and therefore, should be used to understand the structure and form of law, institutions, firms, and all other forms of organization.

Keywords: Barzel; institutional economics; property rights; transaction costs; operationalism

Introduction

I applied to the PhD program at the University of Washington hoping to learn from the trinity of transaction cost economists: Yoram Barzel, Steven Cheung, and Douglass North. Upon my arrival in 1984 I discovered that both Cheung and North had left, and that Yoram was away on sabbatical. It occurred to me that I had made a serious mistake. I also wondered, given that all of my educational eggs were now in one basket, how would I meet (and impress) the man. In the first week of the following semester I had part of my answer; Yoram was standing at my office door. He politely introduced himself and asked if I would come to *his* office; he was refereeing a paper, and he wanted my opinion. I was shocked. As he explained the paper, my only thought was ‘I’m standing in Yoram Barzel’s office!’ Next came the inevitable: ‘Well, what do you think?’ What did I think? I hadn’t thought about anything other than my location. I blurted out ‘The paper is quite long’, and immediately was embarrassed by my banal reply. Yoram demonstrated his natural kindness by responding ‘Yes, I think you’re right. It is too long.’ Abashed, I did not appreciate the professional watershed I’d just experienced.

Yoram Barzel was born in Jerusalem in December 1931, and died in Seattle in December 2022. He was, until the last moment, an economist’s economist who tinkered and toiled with ideas until he found the ‘operational’ explanation that appealed to him. Yoram was a firm believer in operationalism, the idea that models should result in testable propositions. Models that explained everything were pointless tautologies in his mind. In terms of modern causal econometrics, he was all in favour if (i) it was used as a better method of testing, or (ii) it revealed an interesting relationship that then could be explained by a testable model.

Yoram was always highly focused on the economic essence of everything around him and found idle conversations distracting to his mission. His academic pursuit started on one side of the world and led him to the other. In the beginning he was a mainstream empirical economist, but he went down the road less travelled and became a property rights voice in the wilderness who emerged as

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one of the founding fathers of Institutional Economics. Though perhaps not as well appreciated, his ideas are of the same significance as those of Coase, Alchian, or Demsetz.¹

In this commemoration I will synthesize Yoram's key ideas on information, property rights, and transaction costs.² My overview begins with an explanation of his economic origins because his ultimate human capital and output was the product of two independent inputs: his Chicago price theory training and his serendipitous overlap with Steven Cheung at the University of Washington. Within these fortuitous circumstances Yoram was the right economist, at the right time, to create a framework appropriate for addressing questions about the form and organization of human interactions, whether in governments, in markets or firms, or among individual exchanges. His work laid a foundation for others to make further contributions to law and economics, organization theory, and the economics of institutions.

Formative years

After serving a brief stint in the Israeli Army at age 16 during Israel's War of Independence, an even shorter tour on two kibbutzes, and with an unsophisticated knowledge of English, Yoram matriculated at Hebrew University of Jerusalem in 1950 where he immediately came under the spell of Don Patinkin. Patinkin was nine years older than Yoram, had recently graduated from the University of Chicago, and he introduced economics in a forceful way that caught Yoram's attention and convinced him that it was a useful method for thinking about the world. At the time Yoram was marginally caught up in loose left-wing ideas du jour, but these were quickly abandoned for the logical economic framework and the excitement of scientific inquiry and discovery.

While at Hebrew University Yoram was exposed to the writings of Becker, Stigler, and Friedman, and although he was impressed by their substance, argument, and presentation, it did not occur to him that he should study at Chicago. Instead, he became interested in empirical work, and sought a graduate school that might cater to enhancing his econometric knowledge. A young friend he met while working for the Israeli Energy Department convinced him that the University of Chicago was, at that time, the world's best place to become an applied econometrician. Yoram went and never looked back.

Chicago in the 1950s was a dynamic place, and Yoram quickly transformed from quiet immigrant to vocal academic, relishing the application of economics to everything. His advisor, Arnold Harberger, was just a few years older and not only encouraged Yoram's interest in estimation, but also trained him in careful graphical analysis. Yoram was never a mathematical economist, but his graphing skills were first-rate – he always worried about having proper units, and having distances represented at scale. On one occasion while co-writing the third edition of his book, *Economic Analysis of Property Rights*, I produced a particularly complicated graph. Having had the Envelope Theorem beat into me by Gene Silberberg, I had naturally focused on drawing correctly around the equilibrium. Yoram's reaction was that the graph was an 'abomination', because I had not graphed the functions at their extremes. 'You know', he smugly said, 'at Chicago we were trained to worry about values at the boundaries'.

It was this attention to detail that allowed Yoram to see things where others had looked many times and seen nothing. One example suffices. In the standard labour–leisure choice model the wage line is always linear for every hour worked, implying that the worker's productivity is constant regardless of how many hours are worked per day. The standard analysis also ignores that actual wages received are net of any job amenities that exist. For labour economists interested only in behaviour at that margin, these assumptions are benign. For Yoram, always thinking about values at the boundaries, it made little sense. The productivity of workers must diminish as hours of work increase per day, and at

¹Yoram was recognized by the Society of Institutional and Organizational Economics' *Elinor Ostrom Lifetime Achievement Award* in 2017, and the *Journal of Institutional Economics* devoted an issue in his honour in 2020.

²I will ignore his work on index numbers, production, supply, and demand theory. See Lueck (2018) for a survey of his full scholarship.

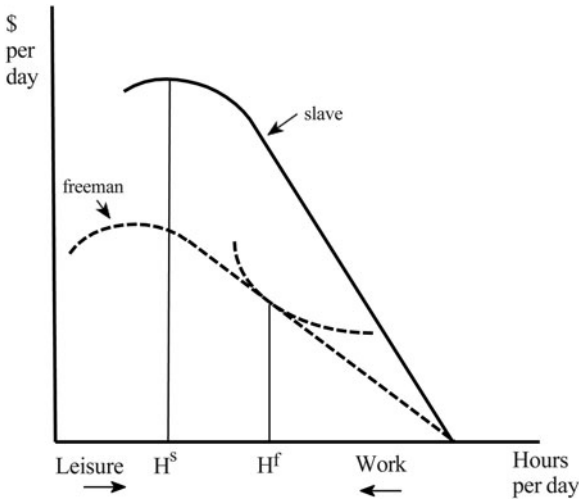


Figure 1. Labor-leisure choice for slave and freeman.

24 hours of work, productivity must be zero.³ And so, when Fogel and Engerman (1974) found that enslaved persons in the American South were both more productive and consumed more calories than poor free persons, and some academics concluded that perhaps slaves were not mistreated, Yoram had the correct answer at hand. Figure 1 adapts Figure II in Barzel (1977a). The solid line is the wage line of the slave, the dashed line that of an otherwise identical free person. The slave's wage line is higher because he is forced to work harder than he would voluntarily choose, and the master chooses $24 - H^s$ hours of work per day for the slave (where H^s is the number of non-working hours for the slave, and H^f is the number of non-working hours for the free person). The free person not only works at a slower pace than the slave, but also trades off working hours with leisure – choosing $24 - H^f$ hours of work per day. Slaves are more productive because they work with more intensity, and because they work more hours per day (but not 24 h). Anyone with that level of exertion requires more calories per day: slaves were fed more because the master wanted more output, not because he was interested in their utility.

Although Yoram audited courses with some of the giants at Chicago, much to his later regret he never attended George Stigler's famous IO workshop in the Chicago Law School, and as a result he was not exposed to the thinking of Aaron Director. Down the road, Director would become a close friend and inspiration, and Yoram always credited him for pushing him towards thinking about transaction costs as not ordinary costs. But that would come later. The immediate result of Yoram's course selections was that he received a thoroughly neoclassical training in *price theory* at Chicago, one drenched in the merits of prices as sufficient signals to coordinate social interactions. This not only provided him with a better set of tools than many of his peers, it also helped him recognize, much later on, all of the exceptions to allocation by price that exist in the world. In the 1970s Yoram was well known for asking questions like, 'why is the pepper free to use at a restaurant? And, not just the pepper, but...?'

Considering where he ended up, it is hard to believe that Yoram Barzel's graduate work and early career were based on applied econometrics. He estimated electric power production functions for his thesis in an attempt to explain what others had called 'huge productivity increases' over the previous decades, and he found that most of the change was simply better use of existing plants. One of the readers on his committee was George Stigler, whose only comment was 'I can find nothing wrong with your work, except that it is boring.' Years later Yoram came to agree with those sentiments.

³Yoram first explored these issues in Barzel (1973a, 1973b).

This work had one blessing, however. In 1961 the University of Washington was in need of an ‘econometrician’, and Yoram was hired to teach statistics.

Like Douglass North and others, in the 1960s Yoram was influenced at Washington by Don Gordon, but it was the arrival of Steven Cheung in 1969 that forever altered his intellectual life. In 1968 Yoram published his famous paper on the optimal timing of innovations, which addressed the notion of the ‘public domain’ and the idea that competition can lead to a zero profit equilibrium that still violated the conditions for efficiency (Barzel, 1968).⁴ Thus, Yoram was already tampering with unorthodox ideas; however, it was the arrival of Cheung, his continuous questioning of everything neoclassical, his path-breaking work on contract choice and price controls, and his knowledge of Coase and Alchian that inspired Yoram and created such a productive environment. North would later call the body of work completed during the 1970s and early 1980s the ‘Washington approach to transaction costs’.⁵

By the early 1970s the neoclassically trained, market-oriented, and operationally savvy economist Yoram Barzel found himself confronted with a force of nature in Steven Cheung. Yoram’s surprising discovery – that competition to acquire a patent dissipated the patent’s value – had whetted his appetite for seeking out other situations in which the Walrusian model fell short. Cheung, who provided both a set of questions and a receptive sounding board, also became a key intellectual sparring partner. The combination made for fertile ground for Yoram, and throughout the 1970s and 1980s he produced, on average, one significant publication per year. This work evolved from analysing specific puzzles of behaviour to a general theory of organization articulated in the 1989 first edition of his property rights book.

The transformative ideas

The public domain

In the mainstream neoclassical model, ownership is undivided, complete, and perfect. The ‘public domain’ is the opposite. A thing that is purely in the public domain is by definition not owned in any sense.⁶ Yoram understood, however, that goods in the public domain did not get there by chance; they were left there because they were not worth establishing ownership over. A simple extension was that when a positively valued good is placed in the public domain, others will compete to make it their private property when it is in their interest to do so. Such competition, of course, is not free. It also takes place on particular dimensions, and those with a comparative advantage on those dimensions will succeed in capturing the good. This process must take place until, at the margin, there are no gains to go further.

In the early 1970s Yoram worked out the mechanics of this idea in the context of allocation by time, or what he called ‘rationing by waiting’. Barzel (1974) developed a simple model to show the equilibrium outcome when goods were placed in the public domain to be given away, and with the final allocation determined by time spent in a queue. His example was a bank giving away \$100 bills to the first 100 customers on a particular day. Aside from the ‘full dissipation at the margin’ result, which he had already established, the model made a number of other interesting claims.

First, changes in processing time do not affect the equilibrium time price. Anyone who has stood in line has thought ‘if we could just fill the form out while waiting, the line would be shorter’. However,

⁴Gordon Tullock published his seminal paper on the costs of monopoly and theft in 1967 – a year ahead of Yoram’s. In the Tullock paper he noted that efforts to gain transfers (whether monopoly rents or goods owned by others) consume resources by the rent seekers. Resources are also spent by owners trying to protect their rents. Tullock argued for an equilibrium in which there was much ‘dissipation’ of wealth. Despite the similar lines of reasoning, Yoram (to my knowledge) was unaware of the connection at the time.

⁵North (1990: 27). North also included Keith Leffler, Masanori Hashimoto, and himself in the development of this approach. The era produced several graduate students who made significant advances in the area: Terry Anderson, Ron Johnson, Chris Hall, John Umbeck, John Wallis, Lee Alston, D. Bruce Johnsen, Wing Suen, Dean Lueck, and perhaps Doug Allen.

⁶Yoram always preferred the term ‘public domain’ to ‘open access’. Open access was, in his mind, often confused with ‘common property’, but more importantly, he felt that ‘public domain’ better expressed the idea of no ownership.

this is false. Suppose the equilibrium time price for the \$100 is one hour, the bank opens at 9:00AM, and it takes 10 minutes to administer the giveaway. The first person in line arrives at 10 minutes after eight, waits 50 minutes until the bank opens, and another 10 minutes to receive the money. Every 10 minutes another person joins the line, and for the rest of the day the line has six people in it. If another teller is added or some other processing innovation takes place that reduces the processing time to five minutes, then the first person shows up at five minutes past eight, and the total time in line is still one hour. Every five minutes someone joins the line, and eventually the line has 12 people in it. Because the equilibrium time price has not changed, the only thing that changes is the number of people in line.

Second, changes in line amenities change the value of what is in the public domain and therefore alter the equilibrium time price. Making a line more comfortable increases the amount of time spent in line. Third, the person who receives the good now depends on the cost of time. High time cost individuals face a higher price for a good when it is allocated by time and are less likely to acquire it. Finally, the total amount of dissipation caused by waiting depends on the dissipation of the intra-marginal waiters. Suen (1989) showed that as the variance in wait times collapses, the total dissipation increases. In the limit, identical waiters dissipate the entire value of what is in the public domain.

The attributes of goods

In hindsight it seems obvious, but it took Yoram a long time to understand that issues involving the public domain are ubiquitous. The breakthrough came with his understanding that goods are bundles of attributes. The idea of goods having attributes goes back at least to Lancaster (1966), but for Yoram the critical issue was that these attributes were not constant but varied in nature. Something as simple as an orange not only has many attributes like colour, texture, shape, water, flavour, vitamins, and minerals, but no two oranges are exactly the same. The quality of oranges is measured by the number of positively valued and negatively valued attributes, *per priced attribute*. Every orange seller knows that higher quality oranges sell for more, but identifying the quality of oranges comes at a cost. At some point it is no longer worthwhile to distinguish one orange from another, and so variance in quality exists in every sorting of oranges into groups.⁷ Anyone who finds an excellent orange in a bin with a set price has captured value out of the public domain.

One of Yoram's first applications of this idea was an *alternative* analysis of taxation (Barzel, 1976).⁸ Yoram again started with the idea that goods are bundles of attributes, but noted that when goods are taxed, the law seldom specifies all of the attributes of the good. As a result, there exist 'unpriced margins' for the good. In an effort to avoid the tax (or capture a subsidy) individuals alter the bundle of attributes and change the quality of the good produced. For example, when a tax per dozen is placed on eggs and the tax does not specify the size of the eggs, farmers will start to use chickens that produce larger eggs. As a result it is possible that the after-tax price to the consumer could rise more than the amount of the tax.⁹

We can return to the question of slavery for a final example of Yoram's early application of the idea of all things being complex bundles of attributes, many of which are in the public domain. As noted above, Yoram's first interest in slavery was a byproduct of his early training in production and labour supply. As he investigated the history of slavery for evidence of intensive effort demanded by the slave owner he came across an interesting institutional detail: manumission. Yoram pondered: how could a

⁷On one occasion Yoram was eating an orange, section by section. After the third section he smiled and said, "There is even variance within the orange!"

⁸For a brief period in the mid-1980s this was one of the top 20 articles cited in economics.

⁹This paper played a pivotal role in my early economic journey. I read the paper as an undergraduate, and immediately realized it explained a radical set of behaviours I had observed growing up. In the early 1970s the Province of BC decided to eliminate property taxes for 'farms'. But what defined a farm? The initial legislation stated a minimum acreage with a minimum amount of land in pasture. Overnight entire forests in rural areas came down as landowners (with no interests in farming) tried to avoid property taxes. The law was soon changed, but the issue of capture remained. Define a tax/subsidy based on certain attributes, and the unpriced margins of the good become defined as well. My 'tax farming' paper became my first publication (Allen, 1985).

slave, by definition a person with no wealth, purchase his freedom? It was an oxymoron – that is, until one realizes that a slave is a complex bundle of attributes, most of which are known only to the slave, and all of which vary from one slave to another. Further, as with the tax example, Yoram realized that slaves could alter their attributes or disguise them, which meant that slave owners had to police slave effort.

If slaves must be policed, then in order to maximize the net value of a slave the owner will create sets of rules and other types of constraints that help mitigate the costs of policing. Thus, there are not only direct costs of monitoring slaves, but also the costs associated with the various institutional features of slavery. Masters restricted the diets of their slaves, provided food in kind, forced religion, allowed them to own non-portable property, and in some cases, enter into contracts that eventually led to their freedom. Yoram's slavery paper is an exemplar of using neoclassical tools to explain the quantities and prices of slavery, then using transaction cost ideas to explain its institutional details.

Information costs, measurement costs, and efficiency everywhere

The 1970s saw a proliferation of theoretical research done around the topic of 'information costs'.¹⁰ In this work the various information cost assumptions were dichotomous: on some margins the costs were zero, and on others they were infinite. Ironically, this divergence led to two opposing predictions, depending on how the assumptions were applied. Early models, assuming that the rewards to producing a public information good could not be fully captured, concluded that 'too little' information was produced. Later models, in which information ultimately led only to wealth transfers and no change in actual output, concluded that 'too much' information was generated.

Yoram saw a fundamental flaw in this literature: it was all couched in the context of 'zero costs of transacting'. Yoram took this assumption to imply '...that one can write a contract containing as many stipulations as desired, all fully enforced, without expense' (1977b: 292). It followed then that if the production of information was wasteful and reduced wealth, wealth maximizers would write contracts that resolved whatever problem arose with using prices in the context of some particular information cost. In his 1977 paper on information costs Yoram showed how the Hirshleifer results on speculation in markets with costly information could be resolved with contracts, and he then did the same thing with respect to Spence's screening model.

Yoram's 1977 information paper, which no doubt was possible only because of his recent work on specific transaction cost issues, was a turning point for several reasons – several of which he did not fully realize at the time. First, although he does not cite Coase, he clearly used the arguments of the Coase Theorem in his deconstruction of the theoretical papers. As I note below, his understanding of Coase became a critical element in transaction cost thinking. Second, although it is not fully articulated, Yoram exploited the connection between transaction costs and information costs. Later he would come to understand that transaction costs depended on a particular type of information problem (separating nature's role in creating variance among a good's attributes from the human role in altering those attributes), but here he recognized that if there was full information on just one margin, the entire 'inefficiency' argument unravelled. Third, Yoram explicitly noted that calling information costs or the consequences of these costs 'inefficient' has meaning only if compared to some ideal world where transaction costs do not exist. To put it another way, calling the costs or outcomes inefficient is meaningless in a practical sense. In a world where all individuals do the best they can under the constraints they face, everything is second-best efficient.¹¹ Finally, Yoram noted that when problems arise from an information cost issue that interferes with the smooth workings of a price mechanism, opportunities arise for others to gain by offering substitutes for pricing. This was a transformative insight for Yoram, one that would consume him for the rest of his career. In his 1977 information paper he provided only three brief examples: group insurance as a form of sorting

¹⁰Some seminal papers were Akerlof (1970), Hirshleifer (1971), Arrow (1973), Spence (1973), and Stiglitz (1975).

¹¹This idea did not originate with Yoram, but more likely Demsetz (1968). Cheung (1974) expressed it as well in the context of price controls.

to avoid adverse selection; bundling and block booking (the DeBeers Diamond case) to mitigate excessive measurement; and, of all things for the Chicago economist, prohibitions by the state to avoid transaction cost behaviour.

These ideas came together in Yoram's most seminal work, his 1982 paper on measurement costs and the organization of markets (Barzel, 1982). Inspiration is an odd thing, and Yoram noted several times in conversation that he had carried around these ideas for several years without being able to bring them together, until the word 'measurement' popped into his mind and all the pieces fell into place. No exchange can take place without some knowledge of what is being traded, but such knowledge requires measurement or some substitute for measurement. Both come at some cost, and these costs will be mitigated by the parties involved. Yoram discussed the issue of sorting, but more importantly he went on to discuss the logic of how various contracts and organizations could replace direct measurement.

Legal rights, economic rights, and the state

In the 1980s Yoram wrote a series of unpublished papers in which he continued to wrestle with the concept of transaction costs. At the request of Aaron Director he wrote a relatively unknown paper on the question, 'are transaction costs ordinary costs?' (Barzel, 1985), in which he addressed the issue head on. It is an interesting exercise to reread this paper because all of Yoram's key insights are there: transaction costs are dissipations of wealth that arise out of human attempts to cheat one another and avoid being cheated; different initial ownership allocations lead to different levels of wealth and wealth distributions; transaction costs depend on information costs; and transaction costs can be altered by restrictions on human behaviour (restrictions on their property rights). Having been trained in price theory, Yoram was still juxtaposing his argument with the Walrusian approach. He concluded:

Thus it is not possible to clearly separate costs directed to 'production' from those directed to 'transaction.'¹² To the individual, they all are costs to be minimized. Nevertheless, a major distinction remains. The Walrusian costs of production cannot be lowered by changes in social institutions whereas the costs associated with those of transacting may be lowered by such institutions. (1985: 13)

And yet something was still missing. When I showed up at Washington I had already been thinking about the relationship between property rights and transaction costs, and upon meeting Yoram this was the subject we immediately started discussing. It is a testament to his intellectual honesty that he welcomed and supported my contributions rather than engage in a turf war. In 1986 I wrote a paper arguing that transaction costs arose from efforts to establish and maintain economic property rights. Yoram understood that the explicit connection of these two ideas was the final piece missing in what we would call 'the theory of economic property rights'. Eventually, after a dozen rejections, my paper was published in an obscure law and economics series (Allen, 1991), but it would have gone nowhere without Yoram's support.

Yoram enjoyed the idea that transaction costs and economic property rights were two sides of the same coin. The distinction forced him to return to an idea originally pushed by Alchian (1965): economic property rights (the ability to actually carry out some decision), depend on, but are distinct from, legal property rights (the ability under the law to carry out some decision).¹³ Yoram was a proponent of the position that the most important role of the state was to define and enforce legal rights, but as always he recognized this could be done only imperfectly. As such, the overlap between the two types of rights is never complete. There are always thieves who use things they do not legally own, and there are always victims of those thieves.

¹²Those who think they can directly measure transaction costs should heed this wise conclusion. See also Allen (2006).

¹³Yoram was hostile to the idea of 'moral' or 'natural' rights in an economic model. Not because he thought they did not exist, but because he felt the concept was not operational. Yoram defended his understanding of the distinction between economic and legal rights in Barzel (2015), in response to a critique by Hodgson (2015).

As Yoram's understanding of the theory of economic property rights developed, his application of the framework broadened. Interested in methods of resource allocation that were far removed from prices, he started to study voting. In typical Barzel fashion, he recognized that voting took place in private business settings and not just in public elections. Firms that use voting do so because it maximizes profits, and the designer of optimal voting rules earns profits when he is correct. Yoram hypothesized, along the lines laid out in his measurement paper, that voting rules were designed to minimize the problems of wealth transfer within organizations. He then applied this idea to condominiums (Barzel and Sass, 1990), and explained the variation in voting rules in terms of mitigating wealth transfer.

Not content with just private voting regimes, Yoram then turned his attention to public voting systems.¹⁴ Much of his work in the 1990s was directed toward understanding the emergence of democracy, the rule of law, and the survival of the state. Interestingly, for someone who was not prone to do research in economic history, this research agenda took him deep down that path. Three papers with Edgar Kiser (Barzel and Kiser, 1991, 1997, 2002) examined the origins of democracy in England, the emergence of the rule of law, and the ability to engage in consensual taxation between rulers and their subjects. They argued that funding new, large-scale projects was best handled by tying together voting rights with tax obligations. However, this required a certain level of security on the part of the ruler. They used this framework to explain variations in voting and taxation between France and England during the Medieval period. Yoram also continued this work on his own. In Barzel (1992) he cleverly noted that a powerful ruler can have his incentive to repudiate loans reduced by agreeing to *not* become a lender and to have the lender constrained to *not* undertake production. He then used this idea to explain restrictions on Jewish lending in the Middle Ages.

Ultimately, Yoram combined his various writings on voting, law, and the state into his 2002 book on the state (Barzel, 2002). This work revolves around a model where there is an all-owning dictator who is incapable of exploiting all of his assets to their best use, but risks overthrow when he allows others access to better exploit their comparative advantage. Dictators, when they feel secure, allow their subjects freedoms in order to increase output that can then be taxed. Subjects who accumulate wealth, however, can become a threat to the dictator. Voting, the rule of law, and other institutional constraints develop in this model as a means of maintaining the balance between rulers and subjects. In some cases, this progression continues until full democracies develop; in most cases, things collapse back into dictatorship or a stateless society. Others, like Acemoglu and Robinson (2019), developed these ideas into more detailed theories of the state and long run growth.

The theory of economic property rights

Yoram Barzel did not write in vacuum, nor did he have the last word. Rather, he was a significant contributor in a line of scholars whose work others found useful and were able to build upon. The research agenda in which Yoram was such a major player developed from the nascent ideas of Coase 60 years ago, into what can now be called Institutional Economics built upon the theory of economic property rights.

The concept of transaction costs goes back to the 1930s, but aside from Coase's ignored paper on the firm, it was not until Coase's paper on social costs that the 'costs of market transactions' became seriously linked with some type of 'rule'.¹⁵ As mentioned, the concept of *economic* property rights as something other than legal rights goes back to Alchian, and Cheung was first to combine these two notions and attempt a general theory in his work on price controls.

Enter Yoram. Yoram's work on his transformative ideas – along with work by some of his students – took the concepts of transaction costs and property rights much further. This work involved the

¹⁴Yoram had written a much earlier paper (with Gene Silberberg) on voting (Barzel and Silberberg, 1973), but it was not concerned about the existence of voting, but rather why people vote.

¹⁵Coase's immediate concern was the rule of liability. That is, when market prices are not free, different rules of liability lead to different outcomes.

articulation of *complex* economic rights, their relationship to wealth, and the important idea that the distribution of rights optimally changes as the strength of rights increases. Yoram was formative in understanding all forms of organizations as ‘distributions of property rights’. These distributions vary in complexity, but they define the incentives of those who make decisions over the assets, and therefore, determine the levels of wealth generated.

To summarize this theory, we need to start with the Coase Theorem, which is best stated this way: *When transaction costs are zero, property rights are perfect and the allocation of resources is independent of any distribution of property rights.*¹⁶ Yoram was adamant that this insight is only an idea and never a reality. In his thinking, transaction costs always exist and prevent a situation of perfect property rights from ever arising. One might ask, if not a reality and not testable, then what use is it? For Yoram and others in this research area, the value of the Coase Theorem is that it declares transaction costs are *necessary* for any argument that attempts to explain the distribution of property rights. Only when transaction costs are positive do contracts, organizations, and institutions matter for resource allocation.

When transaction costs are positive, then at the margin every distribution of complex property rights determines an allocation of resources. Property rights are complex because they are described by three dimensions. First, the property rights to any good can be divided among the various attributes of the good.¹⁷ A building is a complex asset with perhaps thousands of attributes, of which different people own different sets. Even the company (called an insurance company) that owns the negatively valued attribute, ‘fire risk’, is an owner of the building in that they restrict the actions of others and bear some of the risk in the value of the building. Second, the type of property right choice, for example, the rights to exclude, use, enjoy, destroy, transfer, etc., can also be held by different individuals. Complete property rights exist when one person owns all the feasible types of rights to a good. The extent of completeness can be called the scope of property rights. Finally, for any given division and scope there is some probability that a decision will actually be carried out. This is the concept of strength or perfection of rights. To say a property right is perfect is to say it is so strong the decision will be carried out with certainty. We live in a world of complex rights where adjustments are made on all three dimensions, all the time.

It follows that every possible distribution of imperfect property rights is associated with a resource allocation, a wealth level, and a specific level of transaction costs. But every observed distribution of imperfect property rights is the result of someone’s choice. For Yoram and others, the world of rights we observe results from maximizing wealth net of transaction costs.¹⁸ What makes this most interesting is that the distribution of property rights – the specific division, scope, and strength – is not constant as wealth increases, but varies based on the dirt-level transaction costs issues that arise within a given context. Property rights and transaction costs are not just some ‘P’ and ‘T’ in a cost function. This last point is the ‘real Coase Theorem’, which Coase summed it up this way: ‘...when the costs of market transactions are taken into account...the problem is one of choosing the appropriate social arrangement for dealing with the harmful effects’ (1988: 118).

Economic property rights are the fundamental unit of economics, and the theory of these rights is the foundation of the general theory of organization in Institutional Economics. In this theory, positive transaction costs are a *necessary* component to any explanation of organization. Yoram firmly believed, like other property rights purists, that these costs are also sufficient. Transaction cost arguments alone can explain organization, and there is no need to supplement them with other

¹⁶In the third edition of Yoram’s book, *Economic Analysis of Property Rights* (Barzel and Allen, 2023), the first five chapters extensively develop the theory of economic property rights.

¹⁷As noted above, this was one of the fundamental ideas Yoram contributed to this literature.

¹⁸This critical feature of Yoram’s work distinguishes it from the work done in Public Choice, the later writings of North, and much of the modern work by Acemoglu and his many co-authors. Yoram appreciated the concept of rent seeking, but saw it as basic transaction cost behaviour that people would attempt to mitigate. It troubled him that the rent-seeking approach failed to see the gains from reductions in rent seeking that could be accomplished by alternative forms of organization.

complexities, such as risk aversion. If transaction costs are zero, then property rights do not matter and wealth is maximized. When transaction costs are positive, property rights are not perfect, and the level of wealth depends on the distribution of these rights.¹⁹

Conclusion

Yoram Barzel was an active academic until the day he died because for him the pursuit of truth was a calling. He had few hobbies (listening to classical music and snacking), barely tolerated small talk (even if the moment called for it), enjoyed learning (even if it meant a quasi-public revelation of his lack of knowledge), and loved his students. Yoram did not show up at my office door, nor the doors of others, by chance. He was always on the look out for curious minds, economic intuition, and someone to edit his Hebrew English.

I will always remember Yoram as my affable, absent-minded, intellectual Abba. During my time at Washington we spoke every day, always about the economics of this or that, and over the years a month never went by without a similar interaction. Yoram was curious about specialized knowledge of all kinds and was fascinated by my farming background and skill with tools (like hammers and screwdrivers); his interrogations of myself and Dean Lueck allowed him to write an excellent chapter on farm contracts in his book. On one occasion he came to my door early in the morning and asked if I knew how to break into a car with a clothes hanger. When I said yes, he wanted to know every detail (and how it was that I came into such knowledge). Eventually I asked him why he wanted to know. ‘Well, I locked my keys in my car’ was his reply, ‘Perhaps we can retrieve them at the end of the day?’ Several hours later Yoram was at my door again, this time in a panic. ‘We need to break into my car immediately. Security just called, and I left the car running!’

Most people who knew him have a Yoram story like that, which seems fitting for a man who loved a good joke, even at his own expense. But he will be professionally remembered for his ideas. Most academics are lucky if they have one solid idea that is recalled or cited 10 minutes past retirement. Yoram had, at least, five big ideas. More than that, he was able to pull them together in his property rights book. Collaborating with him on the third edition of that book (Barzel and Allen Cambridge, 2023) capped my career-long encounter with a one-of-a-kind thinker. His work remains essential reading for anyone in the field.

Acknowledgement. A commemoration, like a eulogy, cannot help but be written from a personal perspective. I thank Tamar Barzel, Dean Lueck, and Wing Suen for their comments, but I have – for better or worse – relied mostly on my memory of events and conversations with Yoram over the years.

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¹⁹The reverse is not true, see Allen (2015) for an explanation.

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