



STRATEGIJA KONFLIKTA I TEORIJA IGARA

*Robert Auman i Tomas Šeling
Nobelova nagrada za 2005.*

Izbor laureata Nobelove nagrade iz bilo koje oblasti u javnosti nailazi ponekad na neodobravanje ili odmeravanje koliko su izabrani stvarno zaslužni i ko je, po njima, zaslužniji da je dobije. Tako na primer, oko hiljadu akademika i intelektualaca iz Evrope i Amerike uputilo je švedskoj Kraljevskoj akademiji nauka apel da se Nobelova nagrada iz ekonomije za 2005. godinu uskrati Robertu Aumanu i Tomasu Šelingu zbog njihovih političkih stavova.

Potpisnici peticije ocenili su da je nagrada Aumanu i Šelingu "monstruozan čin" jer su profesori ocenili izraelsko povlačenje iz Gaze, koje se desilo u tom periodu, kao veliku grešku. Ovim činom, kako su isticali, suprotnoj strani je poslat signal da se uz dovoljan pritisak svašta može postići.

Osim toga, brojni akademici Aumana optužuju za odobravanje izraelske okupacije palestinskih teritorija. Za Šelingove teorije tvrdili su da su primenjene i tokom

rata u Vijetnamu i bile inspiracija mnogim masakrima nedužnih civila. To, međutim, nije pokolebalo Akademiju u izbor, te se oglasila objašnjenjem da se Nobelova nagrada dodeljuje na osnovu rezultata u određenoj naučnoj oblasti a ne na osnovu političkih stavova laureata.

Robert Auman privukao je pažnju javnosti i samim pojavljivanjem na svečanoj ceremoniji uručenja ovog velikog svetskog priznanja u društvu 34 člana svoje porodice. Inače, ovaj profesor sa Hebrejskog univerziteta u Jerusalimu rođen je 1930. godine u Frankfurtu. Doktorirao je matematiku 1955. godine na Masačusetskom tehnološkom institutu, Kembdž, USA.

Tomas Šeling rođen je 1921. godine u Oklandu, USA. Doktorirao je ekonomiju 1951. godine

na Harvardskom univerzitetu, Kembdž, USA. Tu je jedno vreme radio kao profesor a sada je na Univerzitetu Merilend.



THE STRATEGY OF CONFLICT AND THE GAME THEORY

*Robert Aumann and Thomas Schelling
Nobel Prize for 2005*



The selection of laureates for the Nobel Prize in any given field is, at times, encountered with a public outcry or pondering on how much the selected ones are truly deserving and who, in their mind, is more worthy of receiving the Nobel Prize. Almost one thousand academics and intellectuals throughout Europe and the United States, for example, submitted to the Swedish Royal Academy, their appeal to withhold the Nobel Prize in Economic Sciences for the year 2005 to Robert Aumann and Thomas Schelling on the grounds of their political views.

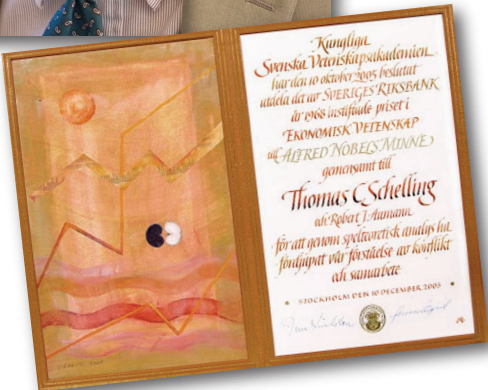
Signatories of the petition were of the mind that awarding the Nobel Prize to Aumann and Schelling would be a “monstrous act” because professors in question have qualified the Israeli forces withdrawal from Gaza, which took place in that period, as a huge mistake. Through this act, the petitioners argued, the

opposing side was receiving a signal that if the pressure was strong enough, anything could be achieved.

In addition, many academics blamed Aumann for approving of the Israeli occupation of the Palestinian territories. For Schelling’s theories they claimed that they have been applied even during the Vietnam War and that

they served as inspiration for many massacres of innocent civilians. The Academy, however, was not hesitant in its selection, and publicly pronounced its arguments that the Nobel Prize is being awarded on the grounds on results achieved in the given scientific field, and not on the grounds of political stances of the laureates.

Robert Aumann attracted public attention with his very appearance at the award giving ceremony of this great world prize, by appearing with an entourage of 34 of his family members. Robert Aumann, professor at the Hebrew University of Jerusalem, was born in 1930 in Frankfurt am Main in Germany. In 1955 he received his



Nobelova nagrada za 2005. godinu dodeljena je Robertu J. Aumanu i Tomasu C. Šelingu za povećanje razumevanja konflikta i saradnje metodom analize teorije igara. Njihov rad je posebno značajan u budućem razvoju nekooperativne teorije igara. Problem su prilazili iz različitih strana, ništa čudno jer su bili i različite struke. Zajednički im je stav da perspektiva teorije igara ima potencijal da omogući i dogradi analizu ljudskih interakcija. Preciznije, mnoge slične društvene interakcije mogu se videti kao nekooperativne igre koje uključuju i zajednički konflikti interes. Društvene interakcije na dugi rok mogu se sveobuhvatno analizirati uz formulu nekooperativnu teoriju igara.

Istraživanja Aumana i Šelinge koja su preneli u svojim radovima pojavila su se na kraju pedesetih godina prošlog veka i bila primljena sa uvažavanjem, ali je prošlo skoro 50 godina do Nobelove nagrade. Na početku njihovi radovi nisu u potpunosti shvaćeni a u poslednjih 25 godina teorija igara je postala prihvatljiv univerzalni alat i jezik u ekonomiji i drugim društvenim naukama.

Jedna od najpoznatijih i najznačajnijih knjiga Tomasa Šelinge je Strategija konflikta. U njoj je data autorova vizija teorije igara kao unificiranog okvira za društvene nauke. Naglašava i činjenicu da skoro svi problemi donošenja odluka sa više igrača sadrže mešavinu konflikta i zajedničkog interesa. Ti odnosi mogu uspešno da se analiziraju metodom nekooperativne teorije igara. Šeling je, takođe, odredio ravnotežu za interesantne klase igara i ocenio kada su te igre i njihove ravnoteže poučne u aktuelnim ekonomskim i društvenim interakcijama. Time je jasno stavio do znanja da je protivnik svetske trke u nuklearnom naoružanju i

svojim naučnim stavom značajno je doprineo da se razumeju implikacije te trke.

U jednom od poglavlja u knjizi analizira se ponašanje kod različitih situacija bilateralnog pregovaranja. Ono obično podrazumeva neki konflikt interesa u kojem strane traže što bolji dogovor. Šeling je istraživao sve taktike pregovaranja u kojima igrač ishod pomera na svoju stranu ali i mogućnost da pregovarač izabere po sebe goru opciju kako bi od protivnika dobio bolju ponudu. U Strategiji konflikta veliki prostor je dat analizi osnovnih pretnji kroz strategiju poznatu kao "drugi udarac". Investiranje u zastrašivanje može biti opasno kada se daju lažna upozorenja ili pogrešne pretpostavke u vezi sa neprijateljskim interesima i namerama.

Šelingova tvrdnja da je ponekad moguće održati dogovor dekompozicijom jedne velike kooperativne akcije u više malih, za dokaz je čekala više od 40 godina. Osim toga, svaki igrač ima izbor između rata i miroljubivog ponašanja. Po Šelingu mir je najprihvatljiviji ishod ove igre. Međutim, ako postoji i zrnice sumnje u protivnikove namere miroljubiva ravnoteža se ruši.

Ova knjiga ima značajan uticaj na ekonomsku i druge društvene nauke. Ona kao i njeni kasniji nastavci "Kontrola armije" koju je napisao zajedno sa M. Halperinom i "Armija i uticaj" u eri hladnog rata značajne su u vojnoj teoriji.

Najznačajniji radovi Roberta Aumana mogu se svrstati u analizu unutrašnje logike teorije igara i proširenje domena i primenljivosti teorije igara. Za vreme Hladnog rata (1965-68.) Auman je sarađivao sa Mišelom Maslerom (Michael Mashler) i Ričardom Sternsom (Richard Stearns) u istraživanju dinamike kontrole



Robert Auman prima Nobelovu nagradu od švedskog kralja Gustava, 10. decembra 2005. god.
Robert J. Aumann receiving his Prize from His Majesty the King Carl XVI Gustaf of Sweden, December 10, 2005

Ph.D. in Mathematics from the Massachusetts Institute of Technology (MIT), Cambridge, USA.

Thomas Schelling was born in 1921 in Oakland, California, USA. He received his Ph.D. in economics from the Harvard University in 1951, Cambridge, USA. For a time, he was appointed Professor of Economics at Harvard, Cambridge, USA and is now a professor at the University of Maryland.

Nobel Prize for Economic Sciences in 2005 was awarded to Robert J. Aumann and Thomas Schelling for the enhancement of understanding of conflict and cooperation through the game-theory analysis. Their work is especially significant for the future development of the non-cooperative game theory. They have approached the problem from different aspects, understandably so as they were of different professional orientation. Their joint stand is that the game theory perspective has a potential to allow for and upgrade the analysis of human interaction. More precisely, many similar social interactions may be perceived as non-cooperative games which also include the common conflict of interest. Long-term social interactions may be comprehensively analysed by applying the non-cooperative game theory formula.

Research conducted by Aumann and Schelling and published in their works appeared in the late 1950s and was received with respect, but it took almost 50 years for them to be awarded the Nobel Prize for their work. In the beginning, their works were not completely comprehended, while over the last 25 years the game theory has become a universally accepted tool and language both in economics and in other social sciences.

One of the best known and the most

significant book by Thomas Schelling remains "The Strategy of Conflict". It presents the author's vision of the game theory as a unified framework for social sciences. He emphasises also the fact that almost all the problems in the decision making process, involving a number of players, contains a mix of conflict and mutual interest. Such relationships may be successfully analysed through the non-cooperative game theory method. Schelling had also determined the balance for the interesting game classes and assessed when such games and their balance are instructive in the actual economic and social interactions. Thus he clearly revealed that he is opposed to the world nuclear arms race and with his scientific stand significantly contributed to the understanding of the intricacies implied in this race.

One chapter in his book offers an analysis of the behaviour in different bilateral negotiation situations. They usually comprise some form of a conflict of interests where the bargaining sides are searching for the best possible agreement. Schelling investigated all the negotiating tactics where the player is shifting the outcome advantageously to his own side,

but also the option where the negotiator chooses for him the less favourite option in order to obtain from the opponent a better offer. In "The Strategy of Conflict", a large space is devoted to the analysis of basic threats through the strategy known as "the second strike". An investment into inflicting fear may be dangerous when giving false warnings or wrong assumptions with respect to the hostile interest and intent.

Schelling's claim that it is possible, at times, to keep the agreement through the decomposition of one large cooperative action into several smaller ones,



Tomas Šeling prima Nobelovu nagradu od švedskog kralja Gustava, 10. decembra 2005. godine
Thomas C. Schelling receiving his Prize from His Majesty the King Carl XVI Gustaf of Sweden, December 10, 2005

vojnog pregovaranja. Njihov rad predstavlja osnov teorije ponovljenih igara sa nepotpunom informacijom. To su igre sa ponavljanjem u kojima svi ili neki igrači ne znaju u kom je periodu igra.

Teorija ponovljenih igara pomogla je u shvatanju širokog spektra empirijskih rezultata, kao što su: očuvanje kooperacije kad ima dosta igrača, cenovni rat i drugi ekonomski i društveni konflikti. Okvir teorije ponovljenih igara daje objašnjenje postojanja i funkcionisanja različitih institucija, počev od trgovačkih komora, Svetske trgovinske organizacije do mafije.

U radu "Subjectivity and correlation in randomized strategies" koji je objavljen u časopisu Matematička ekonomija i "Correlated equilibrium as an extension of Bayesian rationality" u časopisu Ekonometrika Auman je definisao da korelirana ravnoteža dozvoljava da strategije igrača budu statistički zavisne. Korelacija je moguća ako igrači uslove svoju strategiju nekom koreliranom slučajnom veličinom (vremenska prognoza ili neki drugi promenljiv događaj iz okruženja).

Auman je dao značajan doprinos i u drugim oblastima ekonomije: teorija odlučivanja u radu "A definition of subjective probability" kojeg je napisao zajedno sa F. J. Anskombom (F. J. Anscombe); neprekidni model savršene konkurencije u delu "Markets with a continuum of traders" i primena teorije igara u političkoj ekonomiji zajedno sa Mordecai Kurzom (M. Kurz) i Abrahamom Nojmanom (A. Neyman).

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was doomed to a waiting period of more than 40 years before it was proved to be true. In addition, every player has the choice between war and peaceful behaviour. According to Schelling, peace is the most acceptable outcome of this game. However, if there is even a grain of doubt into the opponent's intentions, the peacemaking balance is destroyed.

This book has a significant impact on the economics and other social sciences. Not unlike its later sequences, "Strategy and Arms Control" written together with Morton Halperin, and the "Arms and Influence", published in the Cold

War era, this book remains highly significant for the military theory.

The most important works of Robert Aumann may be placed in the field of analysis into the internal logic of the game theory and broadening of the domain and applicability of the game theory. During the Cold War era (1965-1968), Aumann collaborated with Michael Mashler and Richard Stearns in the research into dynamic of the military negotiations control. Their work serves as basis for the theory of repeated game with incomplete information. These are repeated games in which either all or only some of the players are ignorant of the period in which the particular game is played.

Repeated game theory helped enhance understanding of a broad spectrum of empirical results, such as the preservation of cooperation where the sufficient number of players are involved, price wars, and other economic and social conflicts. The scope of repeated game theory offers elucidation on the existence and functioning of various institutions, starting with chambers of commerce, World Trade Organisation, and up to the mafia clans.

In his work "Subjectivity and correlation in randomised strategies", published in the Journal Mathematical Economy, and "Correlated equilibrium as an extension of Bayesian rationality" in the Journal Econometrics, Aumann offered a definition that the correlated equilibrium allows strategies of players to be statistically dependent. Correlation is possible if the players are to condition their strategy with some correlated random value (for example, a weather report, or some other changeable or random event occurring in a given environment).

Aumann gave a significant contribution also to some other field of economics: theory of decision-making in labour relations, "A Definition of Subjective Probability" written together with F.J. Anscombe; continuum model of perfect competition in the work "Markets with a continuum of traders", and the application of the game theory in political economics written together with Mordecai Kurtz and Abraham Neyman.

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