Contests: Theory and Evidence

A Conference Organized by the

Centre for Behavioural and Experimental Social Science

University of East Anglia, Norwich, UK

July 25-26, 2015

Local Hosts

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Program Summary

Venue: Thomas Paine Study Centre Lecture Hall, UEA

Day 1: 25 July (Saturday)

9.45-10.15: Registration and Tea / Coffee
10.15-10.30: Inauguration and welcome note by the CBESS Director
10.30-12.00: Regular Session 1 (Wolfgang Leininger, Qiang Fu, Tore Nilssen)
Chair: Galina Zudenkova
12.00-1.00: Lunch
1.00-2.00: Lightning Session 1 (Lingbo Huang, Alberto Vesperoni, Alex Vazquez, David Rojo-Arjona, Emanuela Lezzi)
Chair: Karl Warneryd
2.00-2.30: Tea / Coffee
2.30-4.00: Regular Session 2 (Dave Malueg, Oliver Gurtler, Abhijit Ramalingam)
Chair: Yiquan Gu
4.00-4.30: Tea / Coffee / Snacks
4.30-5.15: Keynote Speech (Dan Kovenock)
Chair: Luis Corchon
5.15-6.45: An open-top bus tour to the historic city of Norwich
6.45: Dinner at the Norwich city centre

Day 2: 26 July (Sunday)

9.00-9.30: Late registration and Tea / Coffee
9.30-11.00: Regular Session 3 (Matthias Dahm, Karl Warneryd, Subhasish M. Chowdhury)
Chair: Bettina Klose
11.00-11.30: Tea / Coffee
11.30-12.30: Lightning Session 2 (Marco Serena, Rudi Stracke, Alan Gelder, Anwehsa Mukherjee, Anastasia Danilov)
Chair: David Cooper
12.30-1.30: Lunch
1.30-3.00: Regular Session 4 (Friederike Mengel, Iryna Topolyan, Enrique Fatas)
Chair: Santiago Sanchez-Pages
3.00-3.30: Tea / Coffee / Snacks
3.30-5.00: Regular Session 5 (Jingfeng Lu, Ted Turocy, Carmen Bevia)
Chair: Bibhas Saha
5.00-6.00: Drinks / nibbles and the end of the conference, taxi to dinner
6.30: Dinner at the Norfolk country-side

Some Useful Information

Conference Venue

- The conference will be organised at the *Thomas Paine Study Centre* Lecture Hall (Ground Floor) within the campus. This map will help you to locate this (along with the Broadview Lodge) https://dl.dropboxusercontent.com/u/20808026/UEA_map.pdf

Accommodation

- Accommodation for all the presenters are arranged in *Broadview Lodge* which is located within the campus. The phone number is +44 1603 591 918 (call 01603 591 918 if calling from a British phone). The hotel website is: https://www.uea.ac.uk/about/visiting-staying/visitor-accommodation/broadview-lodge.
- If you arrive too late, you need to get the key from the security (see the map above).
- Please ask the reception about the breakfast location, as it is not in the same building.

Conference Dinners

- The dinner on Saturday will be at Ali Tandoori (http://www.alitandoori.co.uk/).
- The dinner on Sunday will be at Water's Edge (http://www.watersedgewoodsend.co.uk/).
- Transportation to both will be provided by the organizers.

Transport

- **Bus:** There is a bus (number 25) that travels between the campus and the city centre / railway station, and takes around half an hour.
- **Trains to Cambridge:** Train leaving at 6.03 pm from Norwich will reach Cambridge at 7.22 pm; leaving at 6.56 will reach at 8.07; leaving at 7.03 will reach at 8.22. **Next morning** leaving 6.33 am will reach at 7.53 am, leaving 6.51 am will reach at 8.04 am.
- **Trains to London:** Train leaving at 6.00 pm (and every hour) from Norwich will reach London at 8.00 pm (and the following hours). **Next morning** trains every 30 minutes.
- **Taxis:** Taxis at peak-time may take up to 30 minutes to reach the station. It is advisable to book early on over phone. Some of the local taxis are:
    - **Goldstar:** +44 1603 700 700
    - **Five Star:** +44 1603 555 555
    - **ABC:** +44 1603 666 333
    - **Courtesy:** +44 1603 44 66 44
    - **Canary:** +44 1603 41 42 43

Misc.

- There are on-campus ATMs/shops at 'The Square'. Also, you might want to visit the Sainsbury Centre for Visual Arts (http://scva.ac.uk/) located on Campus. See the map!
- Norwich, in general, is a pretty safe city. In case of a query, ask a local host! Campus security number is: +44 1603 592 222.

Details of the Presentations

Day 1: 25th July (Saturday)

Regular Session 1 (Chair: Galina Zudenkova, University of Mannheim)

Presentation 1: Revenue Maximizing Head Starts in Contests

Presenter: Wolfgang Leininger (TU Dortmund)

Co-authors: Joerg Franke, Cedric Wasser

Abstract: We characterize revenue maximizing head starts for all-pay auctions and lottery contests with many heterogeneous players. We show that under optimal head starts all-pay auctions revenue-dominate lottery contests for any degree of heterogeneity among players. Moreover, all-pay auctions with optimal head starts induce higher revenue than any multiplicatively biased all-pay auction or lottery contest. While head starts are more effective than multiplicative biases in all-pay auctions, they are less effective than multiplicative biases in lottery contests.

Presentation 2: "Success Breeds Success" or "Pride Goes Before a Fall"? Teams and Individuals in Multi-contest Tournaments

Presenter: Qiang Fu (National University of Singapore)

Co-authors: Changxia Ke, Fangfang Tan

Abstract: We study the impact of progress feedback on players' performance in multi-contest team tournaments, in which team members' efforts are not directly substitutable. In particular, we employ a real-effort laboratory experiment to understand, in a best-of-three tournament, how players' strategic mindsets change when they compete on a team compared to when they compete individually. Our data corroborate the theoretical predictions for teams: Neither a lead nor a lag in the first component contest affects a team's performance in the subsequent contests. In individual tournaments, however, contrary to the theoretical prediction, we observe that leaders perform worse---but laggards perform better---after learning the outcome of the first contest. Our findings offer the first empirical evidence from a controlled laboratory of the impact of progress feedback between team and individual tournaments, and contribute new insights on team incentives.

Presentation 3: Keep On Fighting: Dynamic Win Effects in an All-Pay Auction

Presenter: Tore Nilssen (University of Oslo)

Co-authors: Derek J Clark, Jan Yngve Sand

Abstract: We investigate a multi-period contest model in which a contestant's present success gives an advantage over a rival in the future. How this win advantage affects contestants' efforts and whether the laggard gives up or keep on fighting are key issues. We find that the expected effort of the laggard will always be higher than the rival at some stage in the series of contests, and this is most likely to happen when at a large disadvantage or at a late stage in the series.

Lightning Session 1 (Chair: Karl Warneryd, Stockholm School of Economics)

Presentation 1: Strategic Momentum in Field and Lab Team Contests

Presenter: Lingbo Huang (University of Nottingham)

Abstract: We empirically examine strategic behaviour of contestants in a dynamic team contest with a series of pairwise component matches. Using the field data from high-stakes professional team tournaments, we find the absence of strategic momentum among team members - the outcomes of previous component matches do not distort the outcomes of future component matches – a result that can be rationalized in a strategic model. The field findings are then reproduced in a real effort laboratory experiment at the level of match outcomes. In addition, the lab data help identify the underlying behavioural principles and also uncover heterogeneous effects on individual efforts.

Presentation 2: A Contest Success Function for Networks

Presenter: Alberto Vesperoni (University of Siegen)

Co-author: Irem Bozbay

Abstract: This paper models conflict within a network of friendships and enmities between players. We assume that each player is either in a friendly or in an antagonistic relation with every other player and players compete for a fixed prize by exerting costly efforts. We axiomatically characterize a success function which determines the share of each player given the efforts and the network of relations. This framework allows for the study of strategic incentives and friendship formation under conflict as well as application of stability concepts in network theory to contests.

Presentation 3: Optimal Contest Design with Budget Constraints

Presenter: Alex Vazquez (Universitat Autònoma de Barcelona)

Abstract: This paper studies the design of a contest between two possible budget constrained players when the organizer of the contest ignores their budgets and whose objective is maximizing aggregate effort. First we define the optimal effort as the maximum levels of effort achievable under a complete information setting. We show that effort is maximized when the contest is biased towards the constrained player in case they have different budgets. Second, we propose a mechanism that implements the optimal effort under incomplete information. This mechanism consists in offering lower prizes to players that claim to be constrained.

Presentation 4: Asymmetry and Focality in Multi-battle Contests

Presenter: David Rojo-Arjona (University of Leicester)

Co-authors: Subhasish M. Chowdhury, Dan Kovenock, Nathaniel Wilcox

Abstract: This article examines behaviour in two-person constant-sum Colonel Blotto games in which each player maximizes the expected total value of the battlefields won. A lottery contest success function is employed in each battlefield. We study whether deviations from Nash prediction could be the result of asymmetries in the primitives of the game, such as labels or values of the battlefields. In the completely symmetric case, we find strong support for Nash behavior. Subjects deviate from Nash behaviour in the presence of asymmetries in labels and the values of battlefields by overbidding in the saliently labelled and high valued battlefields.

Presentation 5: Fairness, Expectations and Sabotage: an Experiment on Tournaments

Presenter: Emanuela Lezzi (University of Insubria)

Co-author: Daniel John Zizzo

Abstract: We ran an experiment where participants enter a 2-player prize competition. Each pair consists of a High Type participant, who performs a previous real effort task better, and a Low Type participant, who performs a previous real effort task worse. Participants receive feedback on their performance rank and their opponents' performance rank. They are also informed about the allocation of an extra monetary reward. Participants are then asked to choose their level of investment. They can also sabotage their opponent. Results show that perceived unfairness of the reward allocation rule, expectations of investment and sabotage, and competitive feelings affect participants' behaviour in the contest.

Regular Session 2 (Chair: Yiquan Gu, University of Liverpool)

Presentation 1: Limited Information-Sharing Alliances in Contests

Presenter: Dave Malueg (University of California, Riverside)

Co-author: Huiling Zhang

Abstract: This paper explores consequences of information sharing in an all-pay auction. In a symmetric, discrete independent private-values all-pay auction players enjoy no benefit from fully sharing their private information, confirming Kovenock, Morath, and Münster's (forthcoming) finding in a two-player model. Consequently, for any positive cost of exchanging information, players would choose not to do so. However, information-sharing agreements among a subset of players may be strictly profitable. Even in those cases where the information exchange members' payoffs remain unchanged, their probabilities of winning the contest may increase.

Presentation 2: Market-Based Tournaments: An Experimental Investigation

Presenter: Oliver Gurtler (University of Cologne)

Co-authors: Lisa Dickmanns, Marc Gürtler

Abstract: In this paper, we study market-based tournaments in which firms use the tournament outcome to update their belief about worker ability. We present a model and derive three testable implications that distinguish the market-based tournament from the "classic tournament" in which firms can commit to pay certain prizes. First, there is a nonmonotonic relationship between the efforts exerted in the tournament and the variance of worker ability. Second, efforts increase in the marginal product of ability. Third, efforts depend on labour market thickness. We conduct a laboratory experiment to test these hypotheses and find support for the first two hypotheses.

Presentation 3: Inequality in Contests

Presenter: Abhijit Ramalingam (University of East Anglia)

Co-authors: Subhasish M. Chowdhury, Joo Young Jeon

Abstract: Conflicts and inequality both are ubiquitous in everyday life. We experimentally explore the effects of inequality on expenditure on conflicts with other individuals. We consider two kinds of inequality - in wealth and in resources that can be used for conflict - and their implications for bids in Tullock contests. We find that the 'poor' spend less resources than the 'rich' but only when they are in a minority. When the 'poor' are in a majority, they spend as much on conflict as do the 'rich'.

Keynote Speech (Chair: Luis Corchon, Universidad Carlos de III Madrid)

Title of the Speech: Generalizations of the General Lotto and Colonel Blotto Games

Speaker: Dan Kovenock (Chapman University)

Co-author: Brian Roberson

Abstract: In this paper, we generalize the General Lotto game and the Colonel Blotto game to allow for battlefield valuations that are heterogeneous across battlefields and asymmetric across players, and for the players to have asymmetric resource constraints. We completely characterize Nash equilibrium in the generalized version of the General Lotto game and then show how this characterization can be applied to identify equilibria in the Colonel Blotto version of the game. In both games, we find that there exist sets of non-pathological parameter configurations of positive Lebesgue measure with multiple payoff nonequivalent equilibria.

Day 2: 26th July (Sunday)

Regular Session 3 (Chair: Bettina Klose, University of Zurich)

Presentation 1: Multiple Sourcing with Endogenous Shares

Presenter: Matthias Dahm (University of Nottingham)

Co-author: José Alcalde

Abstract: This paper extends the Alcalde and Dahm (GEB, 2013) model of multiple sourcing to more than two providers. The procurement procedure allocates shares of the total amount to be procured depending on the bids of suppliers. Surprisingly, procurement expenditures might be lower than under a standard auction format.

Presentation 2: Mobility in Contests

Presenter: Karl Warneryd (Stockholm School of Economics)

Co-author: Axel Bernergård

Abstract: We consider equilibrium in a model where players can move freely between different contests. In particular, we consider circumstances when mobility equilibrium maximizes aggregate effort.

Presentation 3: 'Born This Way'? Prenatal Exposure to Testosterone May Shape Conflict Behaviour

Presenter: Subhasish M. Chowdhury (University of East Anglia)

Co-authors: Pablo Branas Garza, Jeroen Nieboer

Abstract: The ratio between the length of the index and the ring fingers (DR) is a marker for prenatal exposure to testosterone; with higher exposure resulting in lower DR. Existing studies document DR to affect various adult behaviour, but do not consider strategic situations. Based on previously obtained DR, we recruit subjects if their DR is in the top or bottom tercile for their gender and match high-high, high-low and low-low DRs in 2-player homogeneous gender Tullock contests. Low DR males expend significantly higher effort than their high DR counterparts, but the results are exactly the opposite for females. Interestingly, the aggressive behaviour does not result in higher payoff for the low DR males or high DR females.

Lightning session 2 (Chair: David Cooper, Florida State University / UEA)

Presentation 1: Quality Contests

Presenter: Marco Serena (Universidad Carlos III, Madrid)

Abstract: Usual focus of contest theory literature is the sum of contestants' exerted effort. We propose an alternative objective function: effort expected by the (expected) winner. This fits better situations where contestants submit projects, and only the winner's project will eventually be implemented (such as research contests). How does the optimal design of the contest change? On the contrary of the standard setting, we find that the following can be beneficial: heterogeneity across contestants, worsening of contestants' skills, and contestants' induced exclusion.

Presentation 2: Risk in Contests

Presenter: Rudi Stracke (LMU Munich)

Co-authors: David Schindler

Abstract: We analyse how different types of risk affect behaviour of decision makers in contest games. In particular, we implement different versions of a two-player contest in lab experiments to isolate the effects of strategic risk, of risk due to the uncertainty of the contest success function, and of risk due to stochastic prizes. Our preliminary results suggest that these different sources of risk have opposing effects on contest investments.

Presentation 3: All-Pay Auctions with Ties

Presenter: Alan Gelder (Chapman University)

Co-authors: Dan Kovenock, Brian Roberson, Roman Sheremeta

Abstract: We study the two-player, complete information all-pay auction in which a tie ensues if neither player outbids the other by a given amount. In the event of a tie, each player receives a fraction of the prize. Thus players engage in competition over two margins: losing versus tying, and tying versus winning. We characterize the class of symmetric equilibria for a large portion of the parameter space. Equilibria typically involve randomizing over multiple disjoint intervals. Examining the model in a laboratory experiment, we find that for certain parameters the auctioneer may generate more revenue than with the standard all-pay auction.

Presentation 4: Free Riding in Multi-winner Contests: An Experiment

Presenter: Anwehsa Mukherjee

Co-authors: Subhasish M. Chowdhury, Theodore Turocy

Abstract: The aim of this study is to experimentally compare three alternative mechanisms for selecting k winners from a larger set of N contestants using one-shot simultaneous Tullock lotteries, as proposed in the existing theories (Berry, 1993; Chowdhury and Kovenock, 2012 and Chowdhury and Kim, 2014). Unlike single-winner Tullock lotteries, all these mechanisms allow free-riding in the sense of a positive winning probability even when individual contest expenditure falls to zero. The three mechanisms are best-response equivalent and propose the same equilibrium contest expenditure. However, implementing them in the lab we see some significant treatment effects, which indicate that even best-response equivalent strategies may lead to widely different behavioural outcomes.

Presentation 5: Helping in Teams

Presenter: Anastasia Danilov (University of Cologne)

Co-authors: Bernd Irlenbusch, Christine Harbring

Abstract: We study how help can be fostered under relative rewards by means of a team bonus and corporate value statements. A simple model analysis combines elements of relative rewards and team bonus and studies their effect on effort, help and sabotage. The theoretical solution suggests that team members help less as relative rewards increase. This problem can be sufficiently mitigated by a team bonus that is determined by the output of the whole team. This theoretical benchmark is tested in a one-shot experiment.

Regular Session 4 (Chair: Santiago Sanchez-Pages, University of Edinburgh)

Presentation 1: Behavioural Variation in Tullock Contests

Presenter: Friederike Mengel (University of Essex)

Co-authors: A. Masilliunas, J. P. Reiss

Abstract: We conduct an experiment to uncover the reasons behind the typically large behavioural variation and low explanatory power of Nash equilibrium observed in Tullock contests. In our standard contest treatment, only 7% of choices are consistent with Nash equilibrium which is in line with the literature and roughly what random (uniform) choice would predict (6.25%). We consider a large class of social, risk and some other "non-standard" preferences and show that heterogeneity in preferences cannot explain these results. We then systematically vary the complexity of both components of Nash behaviour: (i) the difficulty to form correct beliefs and (ii) the difficulty to formulate best responses. In treatments where both the difficulty of forming correct beliefs and of formulating best responses is reduced behavioural variation decreases substantially and the explanatory behaviour of Nash equilibrium increases dramatically (explaining 65% of choices with a further 20% being "close" to NE). Our results show that bounded rationality rather than heterogeneity in preferences is the reason behind the huge behavioural variation typically observed in Tullock contests.

Presentation 2: The Max-Min Group Contest: Weakest-link (group) All-pay Auction

Presenter: Iryna Topolyan (University of Cincinnati)

Co-authors: Subhasish M. Chowdhury, Dongryul Lee

Abstract: We investigate a group all-pay auction in which each group's effort is represented by the minimum among the effort levels exerted by the group members and the prize is a group-specific public good. Examples of such structure include R&D competitions, sequential production, supply-chain process, negative product or political campaigns, various sporting events, and territorial conflicts. We fully characterize the symmetric equilibria for two groups. We then analyse the case of the general n-group. We find the pure strategy equilibria and specify candidates for the mixed strategy equilibria.

Presentation 3: Sacrifice. An Experiment on the Political Economy of Extreme Intergroup Punishment

Presenter: Enrique Fatas (University of East Anglia)

Co-authors: Catherine C. Eckel, Malcolm Kass

Abstract: We analyse the behavioural determinants of extreme punishment in intergroup conflict, modelled as asymmetric team production contests. Our results strongly support the link between asymmetries and punishment. Relative to a control treatment with no asymmetries, economic inequality has no significant effect on the likelihood of intergroup punishment; however, political asymmetries do increase the frequency and intensity of sacrifice. Interestingly, skilled individuals are more likely to sacrifice themselves to harm the other group, only in the political inequality treatment.

Regular Session 5 (Chair: Bibhas Saha, Durham University)

Presentation 1: Labor Tournament with Sabotage: Equilibrium, Optimal Design and Experimental Evidence

Presenter: Jingfeng Lu (National University of Singapore)

Co-authors: Haoming Liu, Yohanes Eko Riyanto, Zhe Wang

Abstract: A model of two-player tournament where the effects of workers' productive and sabotage efforts are interdependent is analysed in this paper. The players are asymmetric in both their productive and sabotage effort efficiencies. We establish the existence and uniqueness of pure-strategy equilibrium for any level of pay dispersion, and explicitly provide necessary and sufficient conditions for different types of equilibrium to prevail. When two workers are symmetric, we characterize the optimal pay dispersion that maximizes the firm's expected profit. The theoretical predictions are supported by the results of an experimental study.

Presentation 2: Two bidder all-pay auctions with interdependent valuations, including the highly competitive case

Presenter: Ted Turocy (University of East Anglia)

Co-author: Lucas Rentschler

Abstract: We analyse symmetric, two-bidder all-pay auctions with interdependent valuations and discrete type spaces. Relaxing previous restrictions on the distribution of types and the

valuation structure, we present a construction that computes all symmetric equilibria. We show how the search problem this construction faces can be complex. In equilibrium, randomization can take place over disjoint ranges of bids, equilibrium supports can have a rich structure, and non-monotonicity of the equilibrium may result in a positive probability of allocative inefficiency when the value of the prize is not common. Particular attention is paid to the case in which an increase in a bidder's posterior expected value for winning the auction is likely to be accompanied by a corresponding increase for the other bidder. Such environments are "highly competitive" in the sense that the bidder's higher valuation also signals that the other bidder has an incentive to bid aggressively.

Presentation 3: Dominant Strategy Implementation in Contests

Presenter: Carmen Bevia (Universitat Autònoma de Barcelona)

Co-author: Luis Corchon.

Abstract: A contest is a mechanism to allocate prizes. This suggests that contests could be designed to fit the goal of allocating the prize with respect to some criterion. In this paper we explore what can be achieved when designing a contest if the equilibrium concept is dominant strategies. As we learned in the numerous literature of DS implementation in domains of public and private goods, we see that this approach imposes important limitations on the goals that can be achieved.

End of the Conference