*American Economic Review: Papers & Proceedings 2015, 105(5): 402–407*
*http://dx.doi.org/10.1257/aer.p20151017*

*SOCIAL BEHAVIOR IN THE FIELD*[‡]

# Standing United or Falling Divided? High Stakes Bargaining in a TV Game Show[†]

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Bargaining is ubiquitous in our professional and private lives. Not surprisingly, bargaining has received considerable research attention. Because real-world settings generally entail a lack of control, most empirical insights derive from laboratory experiments. The external validity of laboratory findings is, however, still an open question (Levitt and List 2007; Camerer 2015; Baltussen, van den Assem, and van Dolder 2015). Two of the grounds for concern are the frequent use of student subjects and the small or hypothetical stakes. In the present study, we use data from the British TV show *Divided*. This game show combines high stakes and a diverse subject pool within a controlled setting.

We find that individual behavior and outcomes are strongly influenced by equity concerns: those who contributed more to the jackpot claim larger shares, are less likely to make concessions, and take home larger amounts. Threatening to play hardball is ineffective: although contestants who announce that they will not back down do well relative to others, they do not secure larger absolute amounts and they harm others. There is no evidence of a first-mover advantage and little evidence that demographic characteristics matter.

## I. Game Show and Data

*Divided* was developed by the Dutch media firm Talpa, and produced for the ITV network in the United Kingdom by Endemol UK. The show debuted on TV in May 2009 and ran until May 2010. A total of 53 episodes were aired.

Each game is played with three contestants who are strangers to each other. There are two stages: one in which the contestants team up to accumulate a communal jackpot through answering quiz questions, and one in which they have to divide this jackpot between them.

The first stage lasts for a maximum of five rounds. Round 1 has five questions that are worth up to £3,000 each. In the subsequent four rounds the number of questions and the maximum value per question are 4, 3, 2, and 1, and £7,500, £15,000, £30,000, and £75,000, respectively. How much a question actually contributes to the jackpot depends on the team's speed of answering. Incorrect answers halve the jackpot and after three mistakes the team is out of the game. At the end of each round, the team can decide to stop and divide the jackpot, but only if they make that decision unanimously. The online Appendix includes a schematic overview of this first stage.

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[†] Go to http://dx.doi.org/10.1257/aer.p20151017 to visit the article page for additional materials and author disclosure statement(s).

The second stage comprises the bargaining element that is central to our analysis. The jackpot is split into three unequal shares. The largest is marked A, the middle B, and the smallest C. The players unanimously have to decide who gets which. First, they each receive 15 seconds to make their case and stake their claim to one of the shares. The order in which they are asked to do so is determined by their positions on the stage, starting from the viewers' left. If they do not agree immediately, they have 100 seconds to reach consensus in a free-form discussion. With each second that passes they lose one percentage point of the initial jackpot, and after 100 seconds there is nothing left. After 50 seconds there is a time-out. In this brief pause, the contestants keep silent and the game show host summarizes the situation by emphasizing how much has been lost and what is left, or by enumerating the remaining values of the three shares. The second stage can thus be seen as a natural bargaining experiment where "subjects" have to unanimously decide on the allocation of indivisible shares, in a format that allows face-to-face communication and incorporates (close to) continuous costs to bargaining.

For each episode we collected data on the relevant observables, including demographic characteristics of the contestants, the results for each quiz question and the individual contributions to the answers, contestants' claims and how these changed during the bargaining phase, whether and when agreement was reached, and the individual payoffs. Combined, the 53 episodes comprise the games of 56 teams, with some starting in one episode and continuing in the next. Because 13 teams leave the show early after three incorrect answers, 43 are used in our analyses.

Men and women each represent half of the contestant pool. The average contestant is 36 years of age, the youngest 18, and the oldest 70. The average final jackpot is £33,512, the smallest £7,282, and the largest £115,755. These are considerable sums relative to the amounts typically used in laboratory experiments and also many times the median gross weekly earnings of £404 in the UK in April 2010 (Statistical Bulletin Office for National Statistics 2010).

Two-thirds of the time the three shares in the jackpot represent close to 60, 30, and 10 percent. Only two other subdivisions occur: 70/20/10 and 65/25/10, both in 16 percent of the cases. Most contestants initially claim the largest share: 79 percent opt for A, 16 percent pick B, and 5 percent content themselves with C straight away. Only 9 percent of the teams agree immediately, 72 percent do so while the timer counts down, and 19 percent fail to reach agreement and go home empty-handed. The efficiency rate, or the average fraction of the jackpot that is actually awarded, is approximately 50 percent. The average outcome per contestant is £5,633. Would we have run this show as an experiment ourselves, the total costs in subject payoffs alone would have been £726,706. The online Appendix displays the distribution of the bargaining duration and provides more detailed descriptive statistics.

## II. Analyses and Findings

Table 1 summarizes our regression analyses. Model 1 is an ordered probit model that explains a contestant's decision to initially claim share A (3), B (2), or C (1). Model 2 is a probit model for the likelihood that a contestant makes a hardball announcement at the start of the bargaining stage by stating not to back down from her initial claim. This model is estimated for the subset of contestants who initially claimed share A (only one contestant who claimed share B made a hardball announcement). When there is no immediate agreement, some will have to make concessions to bring agreement within reach. Model 3 is a probit model for the likelihood that a contestant lowers her claim. This model is estimated for those who initially claimed share A or B in situations with no immediate agreement.

A contestant's bargaining outcome can be defined relative to others and relative to the initial size of the jackpot. Model 4 considers the payoffs relative to others. This ordered probit model explains the share A (3), B (2), or C (1) that a contestant ends up with. Contestants who fail to reach agreement and go home empty-handed are excluded. By solely looking at the share a contestant receives, this model ignores the efficiency of the bargaining process. Model 5 therefore analyzes the money that players take home as a fraction of the initial jackpot. Additional results are in the online Appendix.

### A. *Demographic Characteristics*

Psychologists have devoted considerable attention to individual differences in negotiation,

Table 1—Regression Results

| | Initial claim (1) | Hardball announcement (2) | Concession (3) | Share won (4) | Prize won/ initial jackpot (5) |
|---|---|---|---|---|---|
| Age | −0.013 | −0.007 | −0.007 | −0.010 | −0.003** |
| | (0.011) | (0.014) | (0.011) | (0.012) | (0.001) |
| Gender (male = 1) | −0.230 | −0.123 | −0.096 | 0.066 | −0.017 |
| | (0.290) | (0.314) | (0.263) | (0.205) | (0.028) |
| Education (high = 1) | −0.008 | 0.033 | −0.057 | −0.003 | −0.017 |
| | (0.333) | (0.329) | (0.303) | (0.212) | (0.035) |
| First mover (first = 1) | 0.007 | −0.121 | 0.300 | −0.181 | −0.009 |
| | (0.288) | (0.279) | (0.327) | (0.337) | (0.035) |
| Stakes second quartile | 0.288 | 0.934** | −0.532** | | −0.089* |
| | (0.438) | (0.464) | (0.248) | | (0.045) |
| Stakes third quartile | 0.090 | 0.746 | −0.545** | | −0.083* |
| | (0.355) | (0.461) | (0.231) | | (0.043) |
| Stakes fourth quartile | −0.208 | 1.009** | −0.156 | | 0.019 |
| | (0.355) | (0.438) | (0.239) | | (0.045) |
| Variance shares | 11.742 | 31.002** | −9.183 | | −4.002** |
| | (12.180) | (14.469) | (10.580) | | (1.500) |
| Contribution correct | 4.133*** | −0.533 | 0.085 | 2.969** | 0.437*** |
| | (1.436) | (1.841) | (1.722) | (1.424) | (0.153) |
| Contribution incorrect | −0.660 | −0.005 | 1.801** | −1.260** | −0.114* |
| | (0.522) | (0.671) | (0.854) | (0.640) | (0.066) |
| Constant | | −2.293** | 0.330 | | 0.397*** |
| | | (1.167) | (0.942) | | (0.097) |
| Cut point 1 | −0.680 | | | −0.285 | |
| | (0.953) | | | (0.616) | |
| Cut point 2 | 0.288 | | | 0.642 | |
| | (0.950) | | | (0.618) | |
| log-likelihood | −73.71 | −53.79 | −74.24 | −109.52 | |
| $R^2$ | 0.084 | 0.103 | 0.069 | 0.051 | 0.186 |
| Observations | 129 | 102 | 115 | 105 | 129 |
| Clusters | 43 | 43 | 39 | 35 | 43 |

*Note:* Standard errors (in parentheses) are corrected for clustering at the team level.
***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

especially during the 1970s and the early 1980s. The general picture regarding demographic and personality characteristics is one of contradictory findings, frequent null results, and low explanatory power (Rubin and Brown 1975; Thompson 1990). For gender, meta-analyses indicate that males are more competitive and better in acquiring favorable outcomes, but the differences are slim and sensitive to the experimental conditions (Walters, Stuhlmacher, and Meyer 1998; Stuhlmacher and Walters 1999).

The demographic variables that we study are gender, age, and education. Contestants normally mention their age when they introduce themselves, but not their education. We have therefore estimated their education on the basis of occupation and other information they provide. We distinguish between contestants with and without a bachelor (or higher) degree. Those who are currently enrolled in higher education and those whose job title suggests work experience equivalent to the bachelor level or higher are also included in the higher education category.

In line with the general picture from earlier studies, we find little evidence that behavior and outcomes are related to demographic characteristics. Gender, age, and education are insignificant determinants of contestants' initial claims, their hardball announcements and concessions, and the shares they end up with. The sole significant result is that younger contestants secure a larger part of the initial size of the pie.

### B. *Contributions*

Entitlements are subjectively-held fairness judgments that people perceive as rights they wish to defend, and can arise from history, custom, the status quo, or contributions (Schlicht 1998). Gächter and Riedl (2005) experimentally show that entitlements influence bargaining behavior and outcomes.

In *Divided*, the only and apparent source of entitlements are contestants' individual contributions to the communal jackpot. Theoretical and empirical work on equity theory suggests that contestants will care about the proportionality of outcomes and inputs, and deem it fair if those who contributed more to the jackpot receive a larger share (Adams 1965; Konow 2003).

To quantify contributions, we estimate both the positive and negative contributions made by each player. Specifically, if the group gave a correct answer, we divide the credit for the answer equally over all contestants who argued in favor of it; those who did not argue for any particular answer, argued for a wrong one, or argued for multiple answers (including or not including the correct one) receive no share of the credit.[1] If the group gave an incorrect answer, the credit is divided equally over those who argued in favor of one of the incorrect answers; those who did not argue for any particular answer or argued for the correct one only are not assigned any credit.

We compute both a composite measure that combines the credits for correct and incorrect answers into one metric, and measures that disaggregate the contributions to correct and incorrect answers. The former is calculated by adding up the contestant's credits for correct answers and subtracting her credits for incorrect answers. We standardize by dividing by the total number of correct answers minus the total number of incorrect answers of the team. The measure for correct (incorrect) answers is calculated by adding up all credits of the contestant for questions answered correctly (incorrectly), and standardizing by the total number of correct (incorrect) answers.

We find that equity concerns play an important role in the bargaining process. Contestants who contributed more to the communal jackpot claim a larger share and end up with a larger prize. (Detailed regression results for the composite measure are in the online Appendix.) There are different effects for positive and negative contributions: positive contributions drive contestants' opening claims, while negative contributions determine whether a contestant makes concessions during the bargaining process. Consequently, both positive and negative contributions determine the final outcomes.

One explanation for this asymmetry is that those with negative contributions initially consider such contributions to be innocent mistakes for which they should not be held accountable, but subsequent communication promotes a more objective, less self-serving view (Loewenstein et al. 1993). The asymmetric effect is also in line with query theory (Johnson, Häubl, and Keinan 2007): contestants' initial focus on positive contributions occurs when the problem is framed in positive terms ("what share do you deserve?"), but switches to negative contributions when the framing becomes negative ("who should move their claim downward?").

### C. *Situational Variables*

The situational factors we consider are the order in which contestants make their initial claims, the stakes, and the differences between the percentage shares to be divided. To investigate whether there is a first-mover effect, we include a dummy variable that takes the value of one if the contestant was the first to make her claim to one of the shares. For the role of stakes we use dummy variables representing the different quartiles of the stake distribution. We use the variance across the percentage shares as a measure for the divergence between the prizes.

[1] There are three exceptions to this rule: (i) if all contestants argued both for and against the correct answer but managed to come to the correct answer together, they are each assigned one-third of the credit; (ii) if two contestants argued both for and against the correct answer and came to the correct answer together while the third remained silent, then these two share the credit; (iii) if contestants made a random guess and this guess turned out to be correct, then they share the credit.

There seems to be no first-mover advantage. Those who get to make their claim early do not behave differently and do not earn more. When the stakes are relatively low, contestants are less likely to announce a hardball strategy. The effect of the stakes on concessions is U-shaped: concessions occur relatively often with low and high stakes, and less so in between. Correspondingly, contestants retain a larger share of the jackpot if the jackpot is at the low or high end of its range. Last, a greater variance of the percentage shares leads to more hardball announcements and less efficient bargaining.

### D. *Hardball*

A considerable line of research focuses on commitment strategies in bargaining (e.g., Schelling 1956; Crawford 1982). In our bargaining setting, contestants cannot formally commit themselves in the sense that they are always free to adjust their claim without incurring monetary costs. However, contestants may attempt to convince others that they feel internally committed to a specific share by making hardball announcements.

Announcing a hardball strategy of not backing down turns out to not be beneficial. (Detailed regression results are in the online Appendix.) Contestants who used this threat improve their relative standing within the group, but they do not manage to obtain larger amounts in an absolute sense because they make it more difficult to reach an agreement. Their opponents are worse off, because contestants who make a hardball announcement also walk the walk: they are less likely to make a concession and thus frustrate the bargaining process.

## III. Concluding Remarks

We have examined high stakes bargaining in the TV show *Divided*. One of the main findings is that entitlements derived from contributions are an important driving force behind behavior and outcomes. This refutes the commonly held belief that fairness concerns will be unimportant when monetary incentives are sufficiently large (Rabin 1993; Telser 1995; Levitt and List 2007). Another interesting result is the inefficacy of adopting a hardball strategy. Due to bargaining costs, the total pie in our game shrinks such that there is no advantage left for the threatening party and others are worse off. This result is in line with game-theoretic reasoning, as simple strategies that anyone can follow should not increase earnings.

One general comment on the game is that the key to maximizing the overall payoff to the team appears to depend on the willingness of one of the players to agree to accept the smallest prize. When no one is willing to concede that he or she contributed the least, deadlocks are common. We conjecture that if an objective tally of relative contributions had been made available to the players they would have found it easier to reach agreements.

Possible selection effects can be a reason for external validity concerns. Contestants self-select into auditions, and are then selected by producers to play the game for real. It is unclear to what degree such processes may have influenced our findings. Selection procedures are of course not unique to game shows, and form an intrinsic part of almost any field or laboratory setting. Yet, our sample varies widely in terms of background characteristics, seemingly forming a cross section of middle-class society that is much closer to a cross section of the general population than the university students commonly employed in experimental work.

The game show setting can be another reason for concerns. While there is no live studio audience, contestants know that many people will observe their behavior on TV. This means that the bargaining game is not strictly one-shot, as contestants' behavior and outcomes might affect their reputation. The specific setting might be viewed as providing an incentive to fight harder, as one may not want to appear weak on TV. However, being viewed as stubborn and responsible for losing a large fraction of the jackpot is also an outcome to be avoided. Furthermore, the game show setting might trigger a desire to "win the contest" and go home with more money than fellow team members. Alternatively, contestants may believe that the game is won if they manage to come to a resolution with the people they teamed up with. Thus, although the game show setting might influence the behavior of the contestants, there is no a priori reason to believe that the environment encourages any particular type of behavior.

For these reasons, we do not consider these possible influences of the specific decision environment to render our findings less interesting or less predictive of behavior than other research settings. In laboratory and field situations there is always some degree of scrutiny, and each setting will cause particular motives to be more prominent than others. It is infeasible to study behavior under each and every possible set of conditions. The optimal approach is therefore to focus on a limited number of diverging settings. The contribution of the present paper should be evaluated in this light. We have employed the unique features of a TV game show to study bargaining behavior outside the laboratory and for stakes that are impossible to replicate in experiments.

## REFERENCES

**Adams, J. Stacy.** 1965. "Inequality in Social Exchange." In *Advances in Experimental Social Psychology.* Vol. 2, edited by Leonard Berkowitz, 267–99. New York: Academic Press.

**Baltussen, Guido, Martijn J. van den Assem, and Dennie van Dolder.** 2015. "Risky Choice in the Limelight." *Review of Economics and Statistics.* doi:10.1162/REST_a_00505.

**Camerer, Colin F.** 2015. "The Promise and Success of Lab-Field Generalizability in Experimental Economics: A Critical Reply to Levitt and List." In *Handbook of Experimental Economic Methodology*, edited by Guillaume R. Fréchette and Andrew Schotter, 249–95. New York: Oxford University Press.

**Crawford, Vincent P.** 1982. "A Theory of Disagreement in Bargaining." *Econometrica* 50 (3): 607–37.

**Gächter, Simon, and Arno Riedl.** 2005. "Moral Property Rights in Bargaining with Infeasible Claims." *Management Science* 51 (2): 249–63.

**Johnson, Eric J., Gerald Häubl, and Anat Keinan.** 2007. "Aspects of Endowment: A Query Theory of Value Construction." *Journal of Experimental Psychology: Learning, Memory, and Cognition* 33 (3): 461–74.

**Konow, James.** 2003. "Which Is the Fairest One of All? A Positive Analysis of Justice Theories." *Journal of Economic Literature* 41 (4): 1188–1239.

**Levitt, Steven D., and John A. List.** 2007. "What Do Laboratory Experiments Measuring Social Preferences Reveal about the Real World?" *Journal of Economic Perspectives* 21 (2): 153–74.

**Loewenstein, George, Samuel Issacharoff, Colin F. Camerer, and Linda Babcock.** 1993. "Self-Serving Assessments of Fairness and Pretrial Bargaining." *Journal of Legal Studies* 22 (1): 135–59.

**Rabin, Matthew.** 1993. "Incorporating Fairness into Game Theory and Economics." *American Economic Review* 83 (5): 1281–1302.

**Rubin, Jeffrey Z., and Bert R. Brown.** 1975. *The Social Psychology of Bargaining and Negotiation*. New York: Academic Press.

**Schelling, T. C.** 1956. "An Essay on Bargaining." *American Economic Review* 46 (3): 281–306.

**Schlicht, Ekkehart.** 1998. *On Custom in the Economy*. New York: Oxford University Press.

**Stuhlmacher, Alice F., and Amy E. Walters.** 1999. "Gender Differences in Negotiation Outcome: A Meta-Analysis." *Personnel Psychology* 52 (3): 653–77.

**Telser, L. G.** 1995. "The Ultimatum Game and the Law of Demand." *Economic Journal* 105 (433): 1519–23.

**Thompson, Leigh.** 1990. "Negotiation Behavior and Outcomes: Empirical Evidence and Theoretical Issues." *Psychological Bulletin* 108 (3): 515–32.

**Walters, Amy E., Alice F. Stuhlmacher, and Lia L. Meyer.** 1998. "Gender and Negotiator Competitiveness: A Meta-Analysis." *Organizational Behavior and Human Decision Processes* 76 (1): 1–29.