Decision Analysis

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Nelson Lau, Yakov Bart, J. Neil Bearden, Ilia Tsetlin

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Exploding Offers Can Blow Up in More Than One Way

Nelson Lau
KCG Asia Pacific, 079912 Singapore, nlau@kcg.com

Yakov Bart, J. Neil Bearden, Ilia Tsetlin
INSEAD, 138676 Singapore
{yakov.bart@insead.edu, neil.bearden@insead.edu, ilia.tsetlin@insead.edu}

We investigate the use of exploding offers in job hiring situations via behavioral experiments. The proposer chooses between issuing an exploding or extended offer, whereas the responder waits for a better outside alternative. Whereas an exploding offer must be accepted or rejected before discovering whether a better alternative will arrive, an extended offer allows the responder first to learn the outcome of the better alternative. If the proposer's offer is accepted, the responder can reciprocate and alter the proposer's payoff. Across multiple studies, we find that a large portion of proposers issue exploding offers even though this results in substantially lower payoffs to themselves. These losses primarily arise from negative reciprocation by responders after accepting exploding offers. We show that decision makers exhibit behavioral consistency between their response to offers and the offers they make to others. Finally, we demonstrate that it is possible to decrease the propensity of making exploding offers through making potential negative reciprocity more salient by encouraging explicit introspection of the outcomes.

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1. Introduction

In many labor markets, job offers come with attached deadlines. Firms often set deadlines to preempt competition and secure high-quality applicants (see Roth and Xing 1994, and references therein). Such strategic usage of deadlines is especially common among companies when they seek to hire newly minted MBAs. For example, consulting firms tend to interview the same set of applicants, and the competition for top talent is usually stiff. However, we have casually observed that the most prestigious consulting firms, whose positions are the most sought after by candidates, tend to be more flexible in their deadlines. Although their deadlines are not entirely open-ended, these firms often allow chosen applicants more time to consider the offer. In contrast, less prestigious firms tend to employ stricter, shorter deadlines. Roth (2008) described a similar relationship in the academic market for young economists.

Job offers with deadlines present difficulties for both the applicant and the firm. On one hand, the applicant who must decide whether to accept a position prior to knowing what other offers might yet come faces a very difficult decision. For an MBA graduate who has accumulated significant debt to finance her education, the decision can be one of the most important ones in her life. Accepting an offer and then reneging on it is unethical and can be costly, since many business schools impose sanctions for such behavior. At Wharton, for example, students can be fined up to $20,000 for reneging on an accepted offer, and they can lose access to the school's career management services.[1] Hence, the decision to accept or reject an exploding offer is often effectively binding.

On the other hand, the firm must choose a deadline for an offer that maximizes the likelihood of hiring the desired candidate. Whereas an extended offer may end up being rejected because the extra time allowed the responder to secure a better alternative, an exploding offer may be rejected because the responder perceives

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[1] http://employer.wharton.upenn.edu/recruiting/calendar-and-policies.cfm, last accessed April 26, 2014.

the opportunity costs of forgoing further search as too high.[2] Moreover, fully narrowing down the objectives of the firm deadline decisions to the binary hiring outcome (yes/no) might have potentially negative consequences for the firm once the offer is accepted.

For example, consider a mid-tier consulting firm that gives an early, exploding offer to a strong applicant (i.e., one who is likely to do well on the job market), which the applicant accepts prior to learning whether better alternatives will yet come. The applicant is then obliged to work for the firm for at least a reasonable period of time. Upon acceptance of the offer, the firm and the new employee engage in another game-like interaction, wherein the employee faces a reciprocation decision. The employee can decide to work more or less productively, as well as choose to be more or less committed to the firm. In particular, an employee might retaliate by choosing a commitment level so low that the firm's ex ante benefit from such a hire is substantially reduced ex post. Whereas labor contracts could rule out such behavior (or make it very costly for employees to shirk) in certain environments (e.g., low-skilled workers in a factory), often the levels of work effort and commitment are only partially observable (e.g., MBA-level jobs in management consulting or academic faculty positions), making it much harder or even impossible to contract upon.

The current research is the first one to explore the role of this potentially important strategic consideration from both prescriptive and descriptive perspectives. We examine whether the choice of offer deadline can affect the responder's behavior beyond the negotiation stage. In other words, might employees hired via exploding offers behave systematically differently from those hired through extended offers? If so, how should these potential differences affect a proposer's choice between issuing an extended or exploding offer? Moreover, do proposers actually take these differences into account when making their deadline decisions?

The remainder of this paper is organized as follows. In the next section, we review the relevant background literature and describe in detail a two-stage deadline game with reciprocation opportunities. Following that, we explore several factors that can influence the proposer's and responder's decisions, and we develop

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[2] These trade-offs were studied in Tang et al. (2009).

related hypotheses. Then we report the results of several studies and conclude with a discussion of the implications of our results for theory and practice, as well as directions for future research.

2. Studying Reciprocation Under Exploding Offers with Ultimatum Deadline Games

2.1. Reciprocation in Employment Settings
Recruitment and job negotiation practices may not only reduce the probability of a job candidate accepting an employer's offer (Boswell et al. 2003, Porter et al. 2005, Rynes et al. 1980), but they can also have lingering effects on the employment relationship (Ferguson et al. 2008). Organizational decisions and managerial actions deemed unfair or unjust can trigger feelings of anger, outrage, and resentment, eliciting a desire for retribution (Skarlicki and Folger 1997). Moreover, perceived mistreatment can result in employees having low job satisfaction (Masterson et al. 2000, Tepper 2000), high turnover intention (Aryee et al. 2002, Ferguson et al. 2008, Masterson et al. 2000, Tepper 2000), and low organizational commitment (Aryee et al. 2002).

In particular, when employees perceive that they have been mistreated, the firm may suffer negative consequences (Aquino et al. 1999). Employee deviance, ranging from unexcused absenteeism to some form of theft, vandalism, or sabotage, is not uncommon in organizations (Harper 1990). Such retaliation against firms may significantly increase firms' costs as a result of lost productivity, legal expenses, insurance losses, damage and waste of property, tarnished reputations, and weakened employee morale (Bensimon 1994, Filipczak 1993). Consequently, these considerations need to be taken into account by any firm when making interviewing and staffing decisions, as well as by policy makers in job market institutions, such as career services departments in business schools (e.g., Reisberg 1998).

In this paper we examine two key mechanisms of retaliation against firms. In Studies 1, 2, and 5, we model the setting in which the employees can punish the firm at negligible cost or benefit to themselves (e.g., situations where employees do not personally gain from actions increasing firms' costs, such as exhibiting low morale). In Studies 3 and 4, we frame the employee–firm interactions in win–lose terms (e.g., situations

where employees can benefit from actions increasing firms' costs, such as concealed theft or absenteeism).

2.2. Ultimatum Games and Outside Options

The game that we introduce and study in the current paper shares some features with the ultimatum game (Güth et al. 1982), which has received considerable attention in behavioral economics. Conventional ultimatum games involve two players—a proposer and a responder. A fixed sum of money is to be divided between the two participants. The proposer's task is to suggest an allocation, and the responder's only decision is to accept or reject it. If the responder accepts, the money is allocated according to the offer; if the responder rejects, both players earn nothing.

The subgame perfect solution, assuming self-interested income-maximizing agents, is for the proposer to offer the smallest permissible amount (e.g., $0.01) and for the responder to accept this offer. Empirically, however, the modal offer is close to 50% of the total amount, and small offers (e.g., $1 out of a $10 pie) are almost always rejected (for reviews, see Bearden 2001, Camerer and Thaler 1995, Gneezy et al. 2003). The standard explanation for this pattern of results is that a concern for fairness trumps pure pecuniary self-interest. Small offers are seen as unfair and are consequently rejected; proposers anticipate this and make larger offers.

The outside options for both players (i.e., the payoffs when no agreement is reached) in the conventional ultimatum game are zero. In many real-world settings, however, negotiating parties have nonzero outside options. For example, an individual currently employed at firm A may receive a job offer from firm B. If such offer has a take-it-or-leave-it structure, the person has the option of staying at firm A.

The presence of nonzero outside options can significantly affect the outcome of ultimatum offers. Knez and Camerer (1995) ran a series of ultimatum game experiments in which proposers and responders each had nonzero payoffs when offers were rejected. Proposers tended to offer too little, and rejection rates were significantly higher when players had outside options (e.g., $2 in a setting where proposers were dividing a $10 pie), suggesting that ultimatum game experimental studies using zero payoffs in the event of rejection may underestimate disagreement rates in more natural settings. Similarly, Schmitt (2004) found that, when holding the proposed allocation constant, offers were rejected more often when responders had an outside option.

2.3. Exploding Offers and Ultimatum Deadline Games

Prior studies of exploding offers used both analytical and experimental methods. Armstrong and Zhou (2013) investigated a market where multiple firms set offer prices and choose whether offers are exploding or have free recall. They also explored the use of a "buy-now discount," in which the offer becomes less favorable if it is not immediately accepted but does remain available even if initially declined (providing an outside option for a consumer). Using a game-theoretic model, they demonstrated that firms may profit from using exploding or buy-now offers. Lippman and Mamer (2012) also used an analytical approach to investigate when it might be advantageous to issue an exploding offer in a competitive setting. They model the job applicant's problem as a sequential search with a finite horizon, in which job offers arrive as a Poisson process. In both settings, neither the consumer nor the candidate has an opportunity to reciprocate to the firm after the offer is accepted.

Tang et al. (2009) investigated exploding offers in an experimental setting that has a close relationship to the one used in this paper. The authors introduced the ultimatum deadline game, in which a proposer makes an offer to a responder and gives the responder a deadline by which to reply. If the offer is accepted by the deadline, the responder gets a payoff of X. Meanwhile, the responder is waiting to learn whether he will receive a better offer that pays $Y > X$. The better offer's arrival is uncertain, and the timing of its arrival (conditional on it coming) is stochastic. If the responder rejects a proposer's offer, he receives a stochastic outside offer in the form of a lottery, earning Y if the better offer arrives and 0 otherwise. Since the conditional probability of the better offer arriving decreases over time, this lottery is more favorable to the proposer when the deadline is short than when it is long. Subjects in the role of proposers tended to set deadlines that were too short, and their offers were frequently rejected. Importantly, there was no opportunity for the responder to reciprocate to the proposer after accepting the proposer's offer.

2.4. Ultimatum Deadline Game with Reciprocation: The Deadline Game

We model the interaction between the hiring firm and the job candidate as the "deadline game" between proposer and responder. Whereas the standard ultimatum game and ultimatum deadline game include only a single bargaining stage, the game in this paper adds a second stage in which a responder who accepts an offer has an opportunity to reciprocate by rewarding or punishing the deadline setter, therefore allowing us to examine the impact of reciprocation on deadline-setting decisions such as those faced by the firms we discussed in §1. The game stages are described next.

First, the proposer gives the responder an exploding or extended offer. Second, if the responder accepts the proposer's offer, she then makes a reciprocation decision, which we model in two ways. In the first version of the game, the responder makes a binary decision to either reward or punish the proposer, at no cost to herself. In the other, the responder plays a dictator game[3] with the proposer.

The proposer makes the first move, choosing to give the responder either an exploding or extended offer that, if accepted, pays both players X. At the same time, the responder is waiting to learn whether she will receive a preferred (better) outside option that pays $Y > X$. The outside option will arrive with probability 0.5 (common knowledge). Importantly, whether it comes will be learned only after the expiration of the exploding offer (but prior to the expiration of the extended offer).

If the proposer gives the exploding offer and the responder rejects it, then the proposer earns nothing and the responder receives a lottery that pays Y with probability 0.5 and nothing otherwise. If the proposer gives an exploding offer and the responder accepts it, then each player earns X, and the game moves to the reciprocation stage. In this scenario, once the responder accepts the exploding offer, she does not learn realization of the lottery.

If the proposer chooses to give an extended offer instead, then the responder learns whether the better alternative arrives before deciding whether to accept the proposer's offer. The better alternative arrives

with probability 0.5; if it does, the responder earns Y, whereas the proposer earns nothing. If the better alternative does not arrive, then the responder accepts the proposer's offer, each player earns X, and the game moves to the reciprocation stage.

The reciprocation stage only occurs if the responder has accepted the proposer's offer, regardless of whether it was an exploding or extended offer. We model reciprocation in two ways: (a) by allowing the responder to reward or punish the proposer at no cost or benefit to herself (*binary reciprocation*; see Figure 1 for a flowchart) or (b) by allowing the responder to play a dictator game with the proposer over an additional endowment provided in the second stage (*dictator allocation*; see Figure 2 for a flowchart). In other words, when binary reciprocation is used, the responder may add or subtract an amount Z from the proposer's payoff X obtained in the deadline stage, without any consequences to herself. However, when dictator allocation is used, the responder can choose to allocate any amount $A \in [0, Z]$ from his additional endowment Z to the proposer. Thus, total payoffs in this case are $(X + Z - A)$ to the responder and $(X + A)$ to the proposer.

3. Theory and Hypotheses

3.1. Responder's Decision: Reciprocation

There is substantial evidence that players reciprocate in ultimatum-related games when given the opportunity. Andreoni et al. (2003) examined a game in which a proposer first unilaterally divided a pie ($2.40) between herself and another player, who could then choose to increase or decrease the proposer's payoff. They found that higher allocations were rewarded more often and punished less. Ben-Ner et al. (2004) examined a two-round dictator game in which subjects alternated the dictator role. When subjects were paired with the same person in both rounds, players who received little in the first round tended to give little in the second round, whereas those who had received generous allocations also tended to give generous allocations. However, when players were paired with a different player in the second round, the correlation between first- and second-round allocations dropped significantly.

We conjecture that deadlines are likely to affect a responder's behavior after an agreement has been reached. Our intuition is that the responder will

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[3] Dictator games are identical to ultimatum games except that the responder has no say in the matter.

Figure 1   Flowchart of Deadline Game (Binary Reciprocation Version)
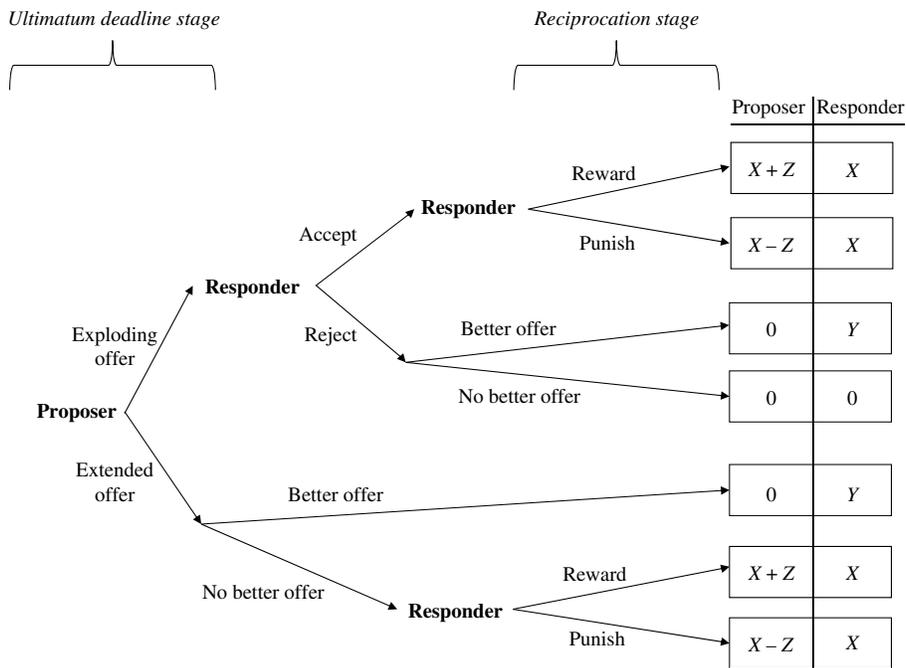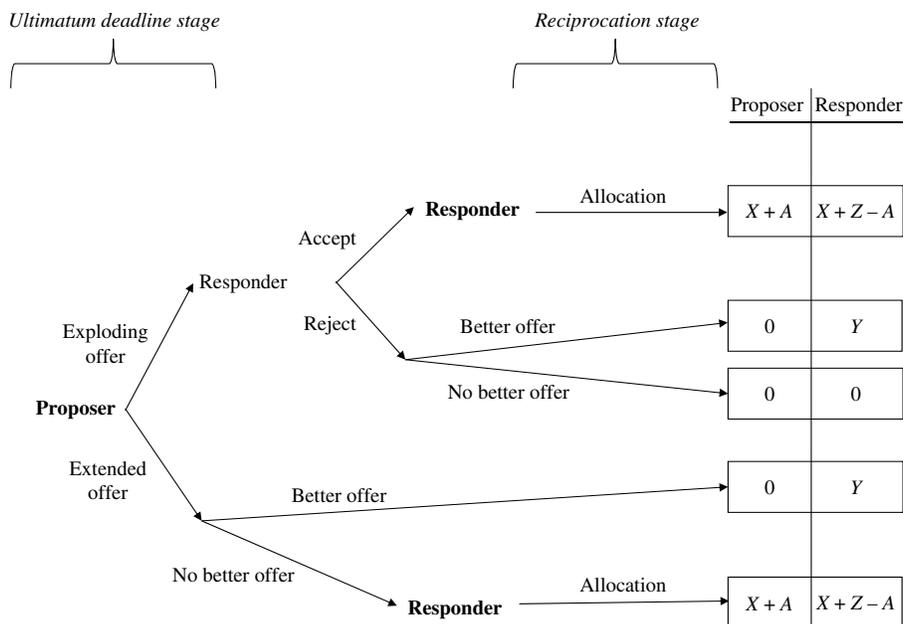

Figure 2   Flowchart of Deadline Game (Dictator Allocation Version)

perceive the extended offer as a more generous one, allowing her to learn the lottery outcome (arrival of a better offer) without running the risk of not having any offers at hand at the end. Consequently, we expect the responder will be more (less) likely to

reciprocate positively upon acceptance of an extended (exploding) offer.

HYPOTHESIS 1 (H1) (RECIPROCATION). *Under binary reciprocation, the proportion of responders choosing to punish an exploding offer will be higher than the proportion*

choosing to punish an extended offer; under dictator alloca- tion, responders' allocations to the proposers in response to exploding offers will be first-order stochastically dominated by those in response to extended offers.

3.2. Proposer's Decision: Decision-Theoretic Approach

The proposer's decision is seemingly simple: to give an exploding or extended offer. However, besides her own preferences regarding risk and other factors, her decision depends on her beliefs or expectations about the responder's behavior. The proposer should consider (a) the probability that an exploding offer will be accepted and (b) the distribution of her payoffs conditional on her offer being accepted (which result from her beliefs about how the responder is likely to reciprocate). Based on her preferences and beliefs, she must choose between making an exploding or extended offer.

We adopt a decision-theoretic approach to model the proposer's decision. Our rationale is similar to the one proposed by Rothkopf (2007) for analyzing auctions: given the complexity of the proposer's problem, which results from tremendous uncertainty about how the responder will act, a decision-theoretic approach provides a more transparent, pragmatic framework for understanding the problem than does a game-theoretic one.

The appendix provides such analysis of the game and its underlying model. The results show that the solution to the proposer's decision problem might depend on her risk preferences, unless the payoffs resulting from exploding and extended offers can be ordered by first-order stochastic dominance. We return to this finding in the discussion of experimental results in the following section.

3.3. Proposer's Decision: Behavioral Consistency

There is extensive evidence that people tend to make decisions in a manner that might differ from a normative solution but that are nonetheless consistent with their prior beliefs and actions (Cialdini et al. 1995, Festinger 1957). Andrade and Ariely (2009) reported that participants who accepted small offers in ultimatum games were less likely to make larger offers than those who rejected small offers. Therefore, we expect similar consistency in participants' behavior in our

studies, where it is operationalized as the association between how an individual would behave in the role of a responder and what that same individual would choose to offer when acting as a proposer.

HYPOTHESIS 2 (H2) (BEHAVIORAL CONSISTENCY). *Higher odds of issuing an exploding offer (as a proposer) are associated with higher odds of accepting an exploding offer (as a responder).*

3.4. Proposer's Decision: Focusing on Perspective Taking

Individuals tend to view economic interactions from their own perspective, and they are relatively insensitive to the factors affecting their counterparties' decisions (Malhotra 2004). Negotiators tend to simplify their decision making by focusing on their own information and goals, and they systematically ignore the thought processes of their counterparties (Carroll et al. 1988). People pay insufficient attention to the decisions of others, even when these decisions will affect their own outcomes (Tor and Bazerman 2003). Judgment and decision making improve when individuals are encouraged to consider why their judgment may be incorrect (Herzog and Hertwig 2009), to "consider the opposite" (Lord et al. 1984), or to consider knowledge that was previously overlooked, ignored, or inconsistent with current beliefs (e.g., Hoch 1985). Consequently, we expect that contemplating the decision from the perspective of the proposer or that of the responder will significantly influence participants' decision processes. In particular, we expect that taking the perspective of the proposer (responder) would lead to a higher (lower) likelihood of ignoring potential reciprocation and a higher (lower) chance of issuing an exploding offer.

Moreover, we expect the degree of such influence generated by perspective taking to depend on the intensity of focus and emotional involvement with a given perspective. Emotions, even if incidental to the task at hand, can have an impact on decision making (Andrade and Ariely 2009, Loewenstein et al. 2001, Schwarz and Clore 1983, Vohs et al. 2007). Pillutla and Murnighan (1996) showed that anger resulting from small offers in ultimatum games is an important predictor of responders' decisions. In line with these findings, we expect that intensity of anticipated emo- tions (i.e., emotions that are expected to be experienced

in the future; Loewenstein et al. 2001) will influence the decision-making process in the game.

HYPOTHESIS 3A (H3A) (PERSPECTIVE TAKING). *For participants considering the proposer's perspective, higher anticipated emotion will be associated with greater odds of issuing an exploding offer.*

HYPOTHESIS 3B (H3B) (PERSPECTIVE TAKING). *For participants considering the responder's perspective, higher anticipated emotion will be associated with lower odds of issuing an exploding offer.*

4. Experimental Games

This section reports results from several experiments in which we examine behavior in the games described above. Performing multiple experiments allowed us to verify that our findings were robust to reciprocation mechanisms (binary reciprocation versus dictator allocation), subject populations (MBA students versus general public), payoffs, currencies (USD, SGD, EUR),[4] and response elicitation protocols (strategy versus sequential method).

Standard experimental economics protocols (Hertwig and Ortmann 2001) were adhered to; deception was avoided, and incentive-compatible payoffs were used. Studies 1, 2, 3, and 5 used the strategy method to elicit responses (Selten 1967; for other uses of this protocol, see Brandts and Charness 2000, Cason and Mui 1997, Tang et al. 2009). This means that every participant specified what action he or she would take under all feasible contingencies, in both the proposer and responder role. This provides a richer set of data and allows investigation of certain questions that cannot be addressed under the sequential method. Study 4 employed a sequential elicitation protocol to rule out the impact of response elicitation format on the reported results.

4.1. Studies 1 and 2: The Deadline Game with Binary Reciprocation

Study 1 examines the deadline game as shown in Figure 1. Here, the decision to reward or punish the proposer is costless to the responder. Allowing responders to freely reward or punish proposers factors out the impact of responders' self-interested concerns. For

instance, if reciprocation were very costly, then the impact of the proposers' deadlines on the feelings of the responders (toward the proposers) might be concealed, as their revelation could be seen to be prohibitively expensive. Study 1 was run with an MBA student sample. Study 2 was a replication of Study 1 run with a general population sample, establishing that the observed results are not specific to MBA students.

4.1.1. Method. *Study* 1 *Participants.* Participants were 102 MBA students at INSEAD. They were told that they would play an experimental job-search game and that two randomly selected pairs (four people) would be selected for actual cash payments. They were informed that the payoffs to the selected players could range from €0 to €200, depending on the decisions of the players' as well as a bit of chance.[5]

Study 2 *Participants.* This was a replication run with 199 Amazon Mechanical Turk (AMT) workers. Each was paid a small participation fee; two pairs were randomly selected and paid bonuses equal to their game outcomes. The AMT platform is an online marketplace for labor, where individuals complete Web-based tasks in exchange for small payments.[6] AMT's worker population is quite diverse and includes a number of real-life job seekers. Horton et al. (2010) showed that experiments on AMT produce results in line with those obtained in standard brick-and-mortar experimental laboratories and suggest that the platform should be used in experiments more frequently as it is a true labor market in itself.

Study 1 *Protocol.* The game was described as a hiring problem, where the proposer was a firm and the responder was a job candidate. The subjects were given full information about the payoffs to players in both roles under all contingencies of the game. In the notation of Figure 1, $X = €80$, $Y = €200$, and $Z = €40$. The chosen values of the payoffs reflect the class of deadline-setting decisions that are the most difficult and most interesting. In these cases, the responder's potential outside option is considerably better than the proposer's offer, but the difference is not so stark that the problem is trivial.

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[4] As of November 1, 2013, US$1 ≈ S$1.24 ≈ €0.74.

[5] This refers to the arrival of the better alternative, which was generated by a random process (flip of a coin) when necessary.

[6] See Kittur et al. (2008), Mason and Watts (2009), and Paolacci et al. (2010) for discussions of the value of AMT for experimental research.

Table 1   Summary Statistics for Studies 1 and 2

	Study 1	Study 2
N	102	199
Proportion issuing exploding offer	0.39 (0.05)	0.55 (0.04)
Proportion accepting exploding offer	0.32 (0.05)	0.54 (0.04)
Proportion punishing exploding offer	0.55 (0.09)	0.41 (0.05)
Proportion punishing extended offer	0.10 (0.03)	0.07 (0.02)
Expectation of exploding offer	€24.71	US$4.71
Expectation of extended offer	€56.08	US$5.72

*Note.* Standard errors are in parentheses.

Study 2 *Protocol.* The protocol for the replication was virtually identical to that of Study 1. The only difference was the absolute payoffs, which were lower, but structured such that the relative payoffs were the same as in Study 1: the euro amounts used in Study 1 were divided by 10 and paid out in U.S. dollars. In other words, $X = $ US$8, $Y = $ US$20, and $Z = $ US$4. In the context of AMT, these are substantial (potential) payments for a relatively brief task.

4.1.2.   Results. *Study 1.* Table 1 and Figure 3 summarize the results of Studies 1 and 2. In Study 1, the capture rate of exploding offers ("Proportion accepting exploding offer") was 32%, which is significantly less than the 50% capture rate under an extended offer ($z = -3.56$, $p < 0.01$ by one-tailed proportion test). Exploding offers were punished 55% of the time, whereas extended offers were punished only 10% of the time, a highly significant difference ($z = 5.96$, $p < 0.01$ by one-tailed proportion test). The observed capture rate and punishment proportions were used to compute an ex post empirical expected payoff to proposers for exploding and extended offers. The results show that exploding offers had a lower expected payoff than extended offers (€24.71 versus €56.08).

The first row in Table 2 displays the ratio of two probabilities: (1) the odds of a participant who would accept an exploding offer (in the candidate role) to give an exploding offer (in the firm role) and (2) the odds of a participant who would reject an exploding offer (in the candidate role) to give an exploding offer (in the firm role). This odds ratio (7.04) was significantly greater than 1, indicating that accepting an exploding offer (as the candidate) was associated with increased odds of making an exploding offer (as the firm).

Figure 3   Flowchart for Results of Studies 1 (Top Numbers), 2 (Middle Numbers), and 5 (Bottom Numbers)
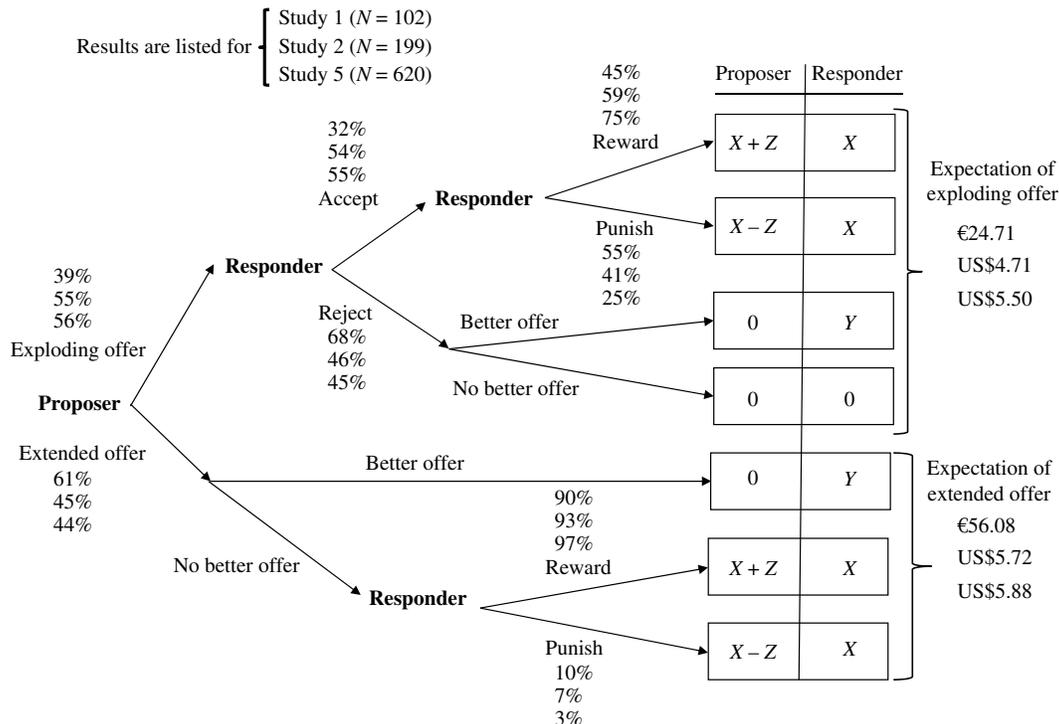
Table 2   Hypothesis 2: Odds Ratios

	N	Odds ratios	95% CI	
Study 1	102	7.04 (3.31)	2.80	17.70
Study 2	199	3.49 (1.04)	1.94	6.27
Study 3	53	4.00 (2.51)	1.17	13.67
Study 4	620	2.96 (0.50)	2.13	4.11
Study 5—FL	174	2.48 (0.78)	1.34	4.58
Study 5—FH	146	4.33 (1.57)	2.13	8.82
Study 5—CL	127	3.35 (1.29)	1.57	7.11
Study 5—CH	173	2.37 (0.75)	1.28	4.40

Notes. Standard errors are in parentheses. FL, firm essay and low emotion score; FH, firm essay and high emotion score; CL, candidate essay and low emotion score; CH, candidate essay and high emotion score.

Study 2. In the replication, the capture rate of exploding offers was 54%, which is not significantly different from the 50% capture rate under an extended offer ($z = 1.06$, $p = 0.14$). Exploding offers were punished by 41% of the subjects, whereas extended offers were only punished by 7% of the subjects, a highly significant difference ($z = 7.41$, $p < 0.01$). The ex post empirical expected payoffs were lower for exploding offers than for extended offers ($4.71 versus $5.72). As shown in Table 2, accepting an exploding offer was associated with significantly increased odds of making an exploding offer (odds ratio of 3.49).

4.1.3.   Discussion. Hypothesis 1 was supported by both Studies 1 and 2. This hypothesis has an important implication if the parameters of the game are set such that the capture rate under the exploding offer (i.e., the proportion of responders who would accept an exploding offer) does not exceed the capture rate under the extended offer (i.e., the 50% of responders who will not receive a better alternative), as we found in both Studies 1 and 2. In this case, issuing the exploding offer would have two consequences: (a) the offer is no more likely to produce a nonzero payoff than an extended offer; and (b) the nonzero payoff, when it occurs, is lower (i.e., more likely to be punished in binary reciprocation). Hence, for a proposer, issuing the exploding offer would be a dominated alternative and should be avoided. Despite this, exploding offers were given by 39% (Study 1) and 55% (Study 2) of the proposers.

One factor that influenced participants' propensity to give exploding offers was behavioral consistency with respect to acceptance of exploding offers. Hypothesis 2 was validated in both Studies 1 and 2, indicating that participants who would accept an exploding offer were more likely to issue an exploding offer. This suggests consistency between how an individual would act in the role of responder and what that same individual would do when in the role of proposer.

4.2.   Studies 3 and 4: The Deadline Games with Dictator Allocations

In Studies 1 and 2, responders could reward or punish proposers at no cost to themselves. In many real-world settings, however, reciprocation (e.g., working harder at one's job) requires a costly expenditure (of time, effort, etc.). To model such settings, the deadline game was modified to impose reciprocation costs on responders. In Study 3, all the elements of the interaction were kept as before, except that the reciprocation stage was not a binary decision to reward or punish but instead a dictator game: responders who accepted the proposer's offer would divide a bonus pool of money between themselves and the proposers (see Figure 2).

Study 4 added further realism by conducting the experiment via the sequential method, played over the course of a week.[7] Each participant played the role of either the proposer or the responder. This demonstrates the robustness of the experimental results to the investigation protocol.

4.2.1.   Method. *Study* 3 *Participants.* Participants were 53 MBA students. Two randomly selected pairs of participants were paid bonuses corresponding to their outcomes in the game.

Study 4 *Participants.* One hundred MBA participants were recruited for the study via email announcements. Subjects were randomly assigned to the role either of proposer or responder, and they were randomly paired (but remained anonymous to each other). Thus, although there were 100 participants, the relevant sample size is the number of pairs (50). Two randomly selected pairs of participants were paid bonuses corresponding to their outcomes in the game.

Study 3 *Protocol.* The experiment was similar to Study 1, except that the reciprocation stage was a dictator allocation instead of a binary reciprocation

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[7] Oxoby and McLeish (2004) found little difference in ultimatum game results when conducted under the strategy method versus the sequential method, but other researchers have argued that differences may be found in other contexts (e.g., Brosig et al. 2003).

Table 3   Summary Statistics for Studies 3 and 4

	Study 3	Study 4
N	53	50 pairs
Proportion issuing exploding offer	0.64 (0.07)	0.56 (0.07)
Proportion accepting exploding offer	0.47 (0.07)	0.46 (0.10)
Mean allocation to exploding offer (SGD)	11.64 (3.10)	3.92 (2.71)
Median allocation to exploding offer (SGD)	5.00	0.00
Mean allocation to extended offer (SGD)	25.69 (2.89)	30.63 (3.59)
Median allocation to extended offer (SGD)	25.00	37.00
Expectation of exploding offer (SGD)	52.66	48.25
Expectation of extended offer (SGD)	62.84	65.32

Note. Standard errors are in parentheses.

decision. In the notation of Figure 1, $X = $ S\$100 and $Y = $ S\$300. The dictator allocation was over a pool of $Z = $ S\$75. That is, in the cases where an offer is accepted, the responder would have sole discretion about how much of the S\$75 to keep for herself and how much to give to the proposer.

Study 4 Protocol. Participants were directed to a website where they received instructions for the game.

Shortly afterward, they received an email notification of their role assignment (all subjects played only one role—either that of proposer or that of responder). The game was the same as in Study 3 but progressed in a turn-based fashion over the course of one week. At each stage of the experiment, we sent subjects a personalized email with a unique link to a website where they input their decisions.

4.2.2. Results. *Study 3.* The results of Studies 3 and 4 are summarized in Table 3 and Figure 4. In Study 3, the capture rate of exploding offers was 47%, which was not greater than the 50% capture rate under extended offers ($z = -0.41$, $p = 0.66$). The left panel of Figure 5 shows the cumulative distributions of dictator allocations (from the responder to the proposer) for exploding and extended offers. The allocations after acceptances of extended offers first-order stochastically dominate allocations after acceptances of exploding offers. The distributions are statistically different, as established with a Wilcoxon signed-rank test ($z = -3.16$, $p = 0.002$). Thus, dictator allocations were significantly higher for proposers who issued extended offers (medians: S\$25 versus S\$5). The ex post empirical expected payoffs were lower for exploding offers than for extended offers (S\$52.66 versus S\$62.84). As shown in Table 2, accepting an exploding offer was

Figure 4   Flowchart for Results of Studies 3 (Top Numbers) and 4 (Bottom Numbers)
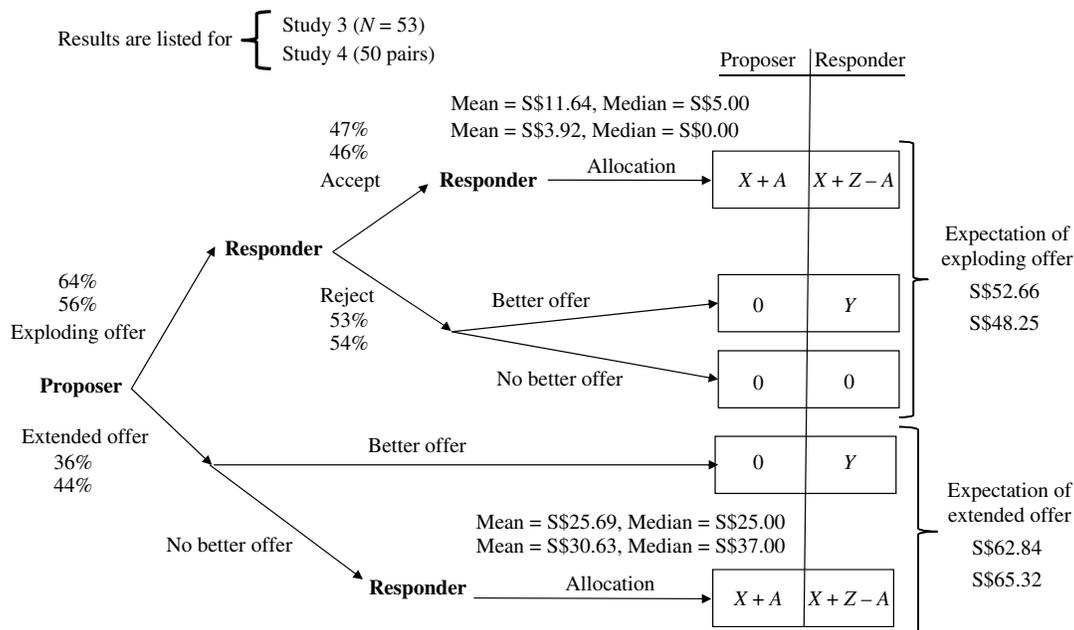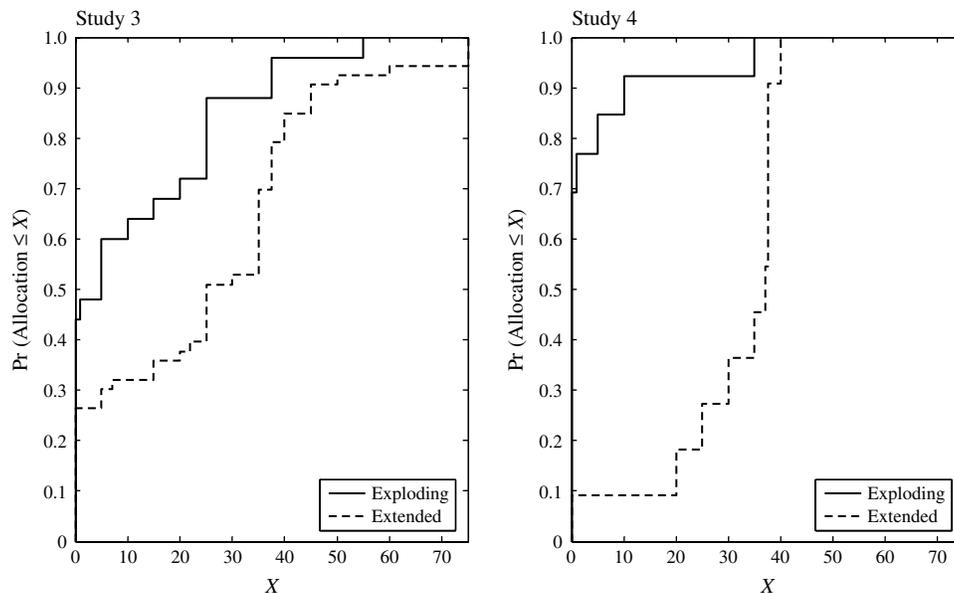
Figure 5   Cumulative Distributions of Dictator Allocations (to Proposer) by Offer Type in Studies 3 and 4

associated with significantly increased odds of issuing an exploding offer (odds ratio of 4.00).

Study 4. In the replication, the capture rate of exploding offers was 46%, which was not greater than the 50% capture rate under extended offers ($z = -0.38$, $p = 0.65$). The allocations after acceptances of extended offers first-order stochastically dominate allocations after acceptances of exploding offers, as shown in the right panel of Figure 5. A Mann–Whitney test rejects the null hypothesis that the exploding and extended allocation distributions are equivalent ($z = -3.59$, $p < 0.001$).[8] Thus, dictator allocations were significantly higher for proposers who issued extended offers (medians: S\$37 versus S\$0). The ex post empirical expected payoffs were lower for exploding offers than for extended offers (S\$48.25 versus S\$65.32).

Comparison of Study 3 *and Study* 4 *Results.* The proportions of subjects who gave and accepted exploding offers in Study 4 were not significantly different from those from Study 3 (all p's > 0.05, by proportion tests). No significant differences were found when comparing dictator allocations for exploding and extended

offers from Study 3 with those from Study 4 by Mann–Whitney tests (exploding offers: $z = 1.68$, $p = 0.09$; extended offers: $z = -1.03$, $p = 0.30$).

4.2.3.   Discussion. Hypothesis 1 was supported in both Studies 3 and 4. Again, support for this hypothesis, combined with the finding that the capture rate under the exploding offer did not exceed the capture rate under the extended offer (50%) in either Study 3 or Study 4, implies that exploding offers had payoffs that were stochastically dominated by those for extended offers. Despite this, exploding offers were given between 56% (Study 4) and 64% (Study 3) of the time.

Hypothesis 2 was also validated in Study 3, suggesting behavioral consistency between how an individual would act in the role of a responder and what the same individual would do when put in the role of a proposer. Hypothesis 2 was not testable in Study 4 because of the sequential elicitation protocol.

Compared with Studies 1 and 2, Studies 3 and 4 establish that even when reciprocation was costly, subjects were more likely to reward extended offers than exploding offers. The absence of differences in the results of Studies 3 and 4 confirm that the observed findings are robust to elicitation protocol (strategy method versus sequential method).

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[8] The Wilcoxon signed-rank test is appropriate in Study 3, as the strategy method yields a within-subject comparison; the Mann–Whitney test is appropriate in Study 4, as the sequential method yields a between-subject comparison.

4.3. Study 5: The Deadline Games with Focusing on Perspective Taking

In Study 5, we return to the deadline game with binary reciprocation (see Figure 1) to explore the decision processes underlying proposers' deadline choices. We added an additional manipulation: after reading the game instructions but before entering their decisions, participants were asked to write a short essay considering a specific outcome that might be faced by a proposer or responder. Writing the essay forced participants to consider the game from a particular perspective. Although it was not possible to prevent participants from thinking of the other perspective as well, the intent was to encourage conscious contemplation of a particular perspective as much as possible. Additionally, the intensity of anticipated emotions was measured after participants' decisions were recorded.

4.3.1. Method. *Study 5 Participants.* Participants were 620 AMT workers. Each was paid a participation fee, and 2 out of every 100 participants were randomly selected, paired, assigned roles, and paid bonuses based on their game outcomes.

Study 5 Protocol. The experiment was identical to Study 2, except for the addition of the essay-writing manipulation and the measurement of anticipated emotion. After reading the instructions but before making their decisions, participants were randomly assigned to one of four conditions and asked to write an essay of at least 200 words on one of the following scenarios:

Firm—Exploding scenario. Participants were asked to write about their feelings if they were the firm player, issued the exploding offer, were rejected by the candidate, and then discovered that the better alternative did not arrive.

Firm—Extended scenario. Participants were asked to write about their feelings if they were the firm player, issued the extended offer, and lost the candidate player to the better alternative.

Candidate—Accept scenario. Participants were asked to write about their feelings if they were the candidate player, were offered the short deadline, accepted, and then discovered that the better alternative would have arrived.

Candidate—Reject scenario. Participants were asked to write about their feelings if they were the candidate

player, were offered the short deadline, rejected, and the better alternative did not arrive.

Note that our research in relation to perspective taking was based on a goal of debiasing proposers (cf. Herzog and Hertwig 2009). Thus, we focused on encouraging participants to consider potential negative outcomes from making a particular decision.

After entering their decisions, participants were asked to think back to the essay scenario and rate the extent to which they would experience an emotion, on a scale from 1 ("not at all") to 9 ("extremely"). The anticipated emotions we measured encompass a wide range of potentially appropriate emotions a manager could experience in the context of our study (listed in Table 4).

4.3.2. Results. Aggregate results of Study 5 were largely similar in pattern to those of the earlier studies (see Figure 3). More participants would punish exploding offers than extended offers (25% versus 3%), the capture rate of exploding offers (55%) was not statistically different from 50%, and 56% of participants chose to issue exploding offers.

To quantify participants' level of anticipated emotion, we summed the numeric responses to 20 negative-emotion items to construct an emotion score. The

Table 4 Cronbach's α and Items for the Anticipated Emotion Score Scale in Study 5

	N	Item-rest correlation	α without item
Angry	620	0.77	0.95
Annoyed	620	0.68	0.95
Cheated	620	0.68	0.95
Defeated	620	0.61	0.95
Deprived	620	0.67	0.95
Disappointed	620	0.63	0.95
Discouraged	620	0.68	0.95
Frustrated	620	0.74	0.95
Hateful	620	0.68	0.95
Irritated	620	0.75	0.95
Loss	620	0.62	0.95
Provoked	620	0.62	0.95
Rejected	620	0.54	0.95
Resentment	620	0.77	0.95
Sad	620	0.63	0.95
Spiteful	620	0.68	0.95
Unhappy	620	0.76	0.95
Upset	620	0.80	0.94
Used	620	0.63	0.95
Vengeful	620	0.63	0.95
Test scale			0.95

resulting scale had a Cronbach's α of 0.95. As shown in Table 4, there was no reason to exclude any item from the scale, since removal would have lowered the α. Since there were 20 items, the minimum possible emotion score was 20 and the maximum was 180. The median emotion score was 81, the 25th percentile was 55.5, and the 75th percentile was 106. The mean was 82.4 and the standard deviation was 34.0.

Behavioral Consistency. As shown in Table 2, accepting an exploding offer was associated with significantly increased odds of issuing an exploding offer (odds ratio of 2.96). There was little difference in the odds ratios when comparing the two essays "Firm—Exploding scenario" and "Firm—Extended scenario" (the 95% confidence intervals (CIs) for these odds ratio estimates overlapped, and both had a lower bound higher than 1), so they were considered together as the "firm" perspective. Combining the two essays "Candidate—Accept scenario" and "Candidate—Reject scenario" was similarly justified.

Moreover, we ran a logistic regression controlling for perspective (firm versus candidate), emotion score, and their interaction. This indicated the same result: odds ratio of 2.92 (SE = 0.50, $p < 0.001$, 95% CI [2.09, 4.08], regression $p < 0.01$).

Finally, Table 2 shows the odds ratio when looking at four subsets of the data: (firm versus candidate perspective) × (low versus high emotion score), where the emotion score was split at the grand median of 81. Notice that the odds ratios are in all cases significantly greater than 1 and that all four subsets produce overlapping 95% CIs. Regardless of perspective or anticipated emotion, accepting an exploding offer was associated with significantly increased odds of issuing an exploding offer.

Focusing on Perspective Taking. Although there were two essay types for each assigned perspective, there was little difference in participants' decisions to issue exploding offers across these two essays. For subjects in the firm perspective condition, a logistic regression was run with offer type as the dependent variable. The regressors were indicator variables for the essay type and emotion score (dichotomized at the grand median) and their interaction. None of the coefficients on the predictors was significant (p's > 0.05). This was also true for the candidate perspective manipulations. Consequently, in the rest of the analysis, we concentrate

on just two combined conditions: essays in the firm perspective and essays in the candidate perspective.

Perspective taking had no significant effect on deadline choice when considered in isolation. Moreover, 53% of subjects in the firm perspective and 58% of subjects in the candidate perspective issued exploding offers, which was not a significant difference ($\chi^2 = 1.51$, $p = 0.22$). Anticipated emotion, considered on its own, also had no significant effect on deadline choice. A logistic regression with offer type as the dependent variable and emotion score and the sole regressor yielded an odds ratio of 1.002 (SE = 0.002, $p = 0.494$, 95% CI [0.997, 1.006], regression $p = 0.49$).

Considered simultaneously, however, perspective taking and anticipated emotion produced significant differences. Statistical tests of the effects of perspective and anticipated emotion on deadline choice are presented in Table 5. The dependent variable was an indicator variable taking a value 1 if an exploding offer was issued and 0 if an extended offer was issued; regressors were an indicator variable for the perspective (1 if a candidate, 0 if a firm), the emotion score, and their interaction. All three coefficients on the regressors were found to be statistically significant (p's < 0.05). On the one hand, for participants in the firm perspective manipulation, a higher emotion score was associated with a higher likelihood of issuing exploding offers. On the other hand, participants in the candidate perspective manipulation demonstrated a lower tendency to issue exploding offers as the emotion score increased than participants in the firm perspective manipulation.

4.3.3. Discussion. Both Hypotheses 1 and 2 were supported by Study 5. Regardless of the perspective taken or the level of anticipated emotion, there was consistency between how an individual would act in the role of responder and what that same individual would choose when put in the role of proposer.

Table 5   **Hypothesis 3: Logistic Regression Results for Study 5**

	Odds ratios	p	95% CI	
Candidate perspective	3.320 (1.446)	0.006	1.413	7.798
Emotion score	1.008 (0.004)	0.028	1.001	1.015
Candidate perspective × Emotion score	0.988 (0.005)	0.012	0.978	0.997
N		620		
Regression p		0.04		

Note. Standard errors are in parentheses.

Hypotheses 3A and 3B were also supported. Considering perspective taking or anticipated emotion in isolation masks participants' differences in propensities to issue exploding offers in aggregate averages. Only when these two factors are considered simultaneously do the differences in decisions become apparent. For participants encouraged to consider the firm perspective, higher anticipated emotions were associated with greater odds of issuing an exploding offer. For participants asked to consider the candidate perspective, higher anticipated emotions were associated with lower odds of issuing an exploding offer.

The magnitude of these differences can be quite large—calculating the predicted probability implied by the model for a subject with the minimum and maximum possible emotion score provides an assessment. In the firm perspective manipulation, a participant at the highest emotion score was predicted to be about 30% more likely to issue an exploding offer than a participant at the lowest emotion score. Similarly, under the candidate perspective manipulation, a participant at the highest emotion score was predicted to be about 20% less likely to issue an exploding offer than a participant at the lowest emotion score.

5. Conclusions

Exploding offers can blow up in more than one way. First, they may be rejected by a desirable candidate. Our experimental studies suggest that in certain circumstances, exploding offers do not increase the capture rate of candidates relative to extended offers. Moreover, they may lead to the reciprocation curse. Although this has been operationalized as a monetary reward or punishment in the current paper, in real-world settings it may manifest as increased turnover intentions, lost productivity, lowered morale, absenteeism, or even concealed theft (Bensimon 1994, Ferguson et al. 2008, Filipczak 1993, Harper 1990).

This paper introduced the deadline game, wherein a proposer chooses between issuing an exploding offer or an extended offer. The responder, when accepting the offer, can reciprocate by altering the proposer's payoff. Several experimental studies were conducted using different versions of this game. Issuing an exploding offer resulted in lower payoffs to proposers and was a dominated alternative. This result was robust to reciprocation cost, subject population, and elicitation protocol. The findings were consistently demonstrated

at several payoff settings using a variety of currencies. Nonetheless, a substantial fraction of subjects did issue exploding offers when in the proposer's role.

In the deadline game, the proposer's payoff depends on two factors: the probability that the responder accepts the offer (fixed at 50% for an extended offer; for an exploding offer, this probability equals the proportion of responders that would accept an exploding offer) and the responder's allocation decision at the reciprocation stage. The main factor that resulted in exploding offers being inferior to extended offers (from the proposer's standpoint) was the variation in responders' reciprocation across these offer types. The proportion of the responders that would accept an exploding offer was close to 50% in three out of four studies (and never significantly higher than 50%), but responders reciprocated much less positively to the proposer after accepting an exploding offer than when accepting an extended offer. In other words, the proposers issuing an exploding offer suffered from what we call the *reciprocation curse*.

Normatively, proposers should issue exploding offers if they believe that the higher capture rate will compensate for the reciprocation curse. Our results suggest that factors other than such rational calculation significantly influenced participants' deadline choices. A key predictor of whether a participant would issue an exploding offer was behavioral consistency. Specifically, participants who would accept an exploding offer in the candidate role were markedly more likely to issue an exploding offer in the firm role. This systematic bias led a sizable portion of participants to make a costly deadline choice error.

Two other factors were identified in participants' deadline choice decision processes: perspective taking and anticipated emotion. Participants with high anticipated emotions when thinking about the deadline game from the firm perspective were more likely to issue exploding offers than those with lower anticipated emotions. On the other hand, participants with high anticipated emotions when thinking about the deadline game from the candidate perspective were less likely to issue exploding offers than those with lower anticipated emotions.

Interestingly, subjects did not exhibit behavioral consistency with respect to punishment of exploding versus extended offers, unless they focused on a

particular perspective. In Studies 1, 2, and 3, subjects' own decisions to reciprocate negatively to exploding or extended offers were not significantly associated with different likelihoods of issuing exploding offers. This pattern of behavior was changed by the essay manipulations in Study 5, in which we found that a tendency to punish exploding rather than extended offers was associated with decreased odds of issuing an exploding offer. This suggests that decision makers tend to ignore the potential for negative reciprocation (in line with the findings of Tor and Bazerman 2003, for example). However, our results show that this oversight can potentially be corrected through perspective manipulation. Making participants think through potential outcomes seemed to raise the salience of negative reciprocity, as evidenced by the extent to which participants' deadline choices were associated with their relative punishment preferences.

There are a few limitations of our research. First, although our reliance on payoff functions in lieu of making participants to perform any actual tasks in our experimental methodology is consistent with labor economics literature (e.g., Fehr et al. 1998), we do not examine the potential implementations of that reciprocation decision in practice in depth. The managerial rationale behind this research is primarily concerned with work environments where a lack of commitment, low effort, and other types of negative reciprocation behavior could be observed only partially and imperfectly, as is common, for example, in most jobs taken by MBA alumni. These types of jobs often require creativity and higher-order cognitive effort—consequently, lab studies are not well suited to study implementation details in practice. However, we hope that future field studies will add more context-specific realism to our research.

Second, the binary nature of reciprocation in Studies 1, 2, and 5 makes punishing an extended offer a potential artifact of our study design. Although "reward" and "punish" can indeed convey some non-neutral meanings, such simplification was necessary as a first step toward understanding the reciprocation consequences of exploding offers. Moreover, in Studies 3 and 4, we have allowed the responder's strategies to be in continuum space, and the results are consistent with the observed outcomes of Studies 1, 2, and 5.

As far as managerial implications are concerned, we do not propose the usage of extended offers as a

universal solution. In some settings, proposers should reasonably prefer exploding offers. One such example could be a sequential interviewing of a series of candidates, in which case exploding offers provide time to attempt to hire other candidates. There may also be certain instances in which exploding offers do increase capture rates, perhaps as a result of competing firms' recruitment practices. However, many participants in our studies appear to have ignored the potential for negative reciprocation toward their choice of exploding offers, as evidenced by the high percentage of subjects who chose to give exploding offers, despite this being a dominated alternative. Consequently, we recommend that managers choosing between issuing exploding and extended offers should at least consider the possibility of the reciprocation curse as a factor in their decision-making process.

Moreover, managers who would themselves accept an exploding offer might be doing their firms a disservice by choosing to issue exploding offers to potential hires. Recognizing this behavioral consistency as a systematic psychological bias should help decision makers counteract its effects. Proposers should not feel compelled to issue offers in line with what they would accept as responders when there is significant evidence that this leads to less profitable outcomes.

Finally, our findings suggest that the perspective-taking approach can mitigate the negative effects of the reciprocation curse and behavioral consistency bias with respect to issuing and responding to offers. While focusing on potential outcomes of their deadline decision, managers should also take note of how they respond emotionally to these possible scenarios. Mentally placing themselves in the candidate's shoes might turn these managers' emotionality from a liability to an asset—through purposeful focusing on their counterparty's situation, these managers might use their strong feelings to arrive at a more optimal decision.

Appendix

Proposer's Decision
To model the proposer's problem, let us denote the subjective (to the proposer) probability that an exploding offer will be

accepted by $a_{\exp}$. One important question for the proposer is whether $a_{\exp}$ is greater or smaller than 0.5, the probability that an extended offer will be accepted. She also needs to compare her (subjective) distributions of her nonnegative payoffs, conditional on the responder accepting exploding and extended offers. Let $F_{\exp}(F_{\mathrm{ext}})$ denote the cumulative distribution function of her payoff, conditional on the responder accepting an exploding (extended) offer.

In general, the proposer's choice between issuing exploding and extended offers depends on her estimates of $a_{\exp}$, $F_{\exp}$, F_{ext}, and her risk preferences. However, Observation 1 below shows that sometimes this choice is independent of the proposer's risk attitude.

OBSERVATION 1. *Suppose that F_{ext} dominates $F_{\exp}$ in the sense of first-order stochastic dominance, and $a_{\exp} \le 0.5$.* In this case, issuing an extended offer results in a distribution of payoffs that first-order dominates the distribution of payoffs resulting from an exploding offer. Similarly, if $F_{\exp}$ first-order dominates F_{ext} and $a_{\exp} \ge 0.5$, the proposer is better off issuing an exploding offer, as its resulting payoff distribution first-order stochastically dominates the extended offer payoff distribution.

Therefore, if the proposer believes that the responder will be more generous (in terms of first-order dominance) after accepting an extended offer than after accepting an exploding one, and she believes the chances of the responder accepting an exploding offer are less than 0.5, then she should issue an extended offer. This holds regardless of her risk preferences, as long as the proposer wants to be consistent with the first-order stochastic dominance criterion.

Of course, sometimes the conditions required for Observation 1 to provide the basis for a clear-cut decision will not be satisfied. For example, this would be the case if F_{ext} first-order dominates $F_{\exp}$ and $a_{\exp} > 0.5$. In this case, the choice between issuing extended and exploding offers would also depend on the responder's risk preferences. We explore this in the setting corresponding to Studies 1 and 2, because there, F_{ext} and $F_{\exp}$ can be characterized by a single parameter—the probability that the responder rewards the proposer. Denote the (subjective) probability that the exploding (extended) offer will be rewarded by $r_{\exp}$ (r_{ext}). If rewarded, the proposer's payoff is H ($H = €120$ in Study 1 and $H = \$12$ in Study 2), and if punished, the proposer's payoff is L ($L = €40$ in Study 1 and $L = \$4$ in Study 2).

PROPOSITION 1. *Consider a proposer with utility function $u(\cdot)$. Denote $u_L = [u(L) - u(0)]/[u(H) - u(0)]$. The proposer prefers an exploding (extended) offer if $a_{\exp} > (<)0.5[r_{\mathrm{ext}} + (1 - r_{\mathrm{ext}})u_L]/[r_{\exp} + (1 - r_{\exp})u_L]$.*

PROOF. If issuing an exploding offer, the proposer's expected utility is $a_{\exp}[r_{\exp}u(H) + (1 - r_{\exp})u(L)] + (1 - a_{\exp})u(0)$. Under an extended offer, the expected utility is $0.5[r_{\mathrm{ext}}u(H) + (1 - r_{\mathrm{ext}})u(L) + u(0)]$. An exploding offer yields greater expected utility if $a_{\exp}[r_{\exp}u(H) + (1 - r_{\exp})u(L)] + (1 - a_{\exp})u(0) > 0.5[r_{\mathrm{ext}}u(H) + (1 - r_{\mathrm{ext}})u(L) + u(0)] \Leftrightarrow a_{\exp} > 0.5[r_{\mathrm{ext}} + (1 - r_{\mathrm{ext}})u_L]/[r_{\exp} + (1 - r_{\exp})u_L]$. $\square$

Suppose that $r_{\exp} < r_{\mathrm{ext}}$. If $a_{\exp} \le 0.5$, by Observation 1 an extended offer is better in the first-order stochastic dominance sense. If $a_{\exp} > 0.5$, the proposer faces a trade-off: an exploding offer has higher chances of acceptance but lower chances of reward. In this case, the proposer's choice would depend on her degree of risk aversion. Intuitively, a risk-averse proposer wants to maximize the chances of getting "at least something" and thus prefers a poorer lottery (with a probability of reward being $r_{\exp}$) with higher chances ($a_{\exp}$), rather than a better lottery with a probability of reward being r_{ext} but with lower chances (0.5). The corollary below confirms this intuition.

COROLLARY. *Suppose $r_{\exp} < r_{\mathrm{ext}}$. Consider Proposer 1 with utility function for wealth $v_1(w)$ and Proposer 2 with utility function for wealth $v_2(w)$, where Proposer 2 is more risk averse than Proposer 1 (i.e., $v_2(w) = \phi(v_1(w))$, where $\phi(\cdot)$ is increasing and concave). If Proposer 1 prefers the exploding offer, then Proposer 2 also prefers the exploding offer.*

PROOF. Let $u_{L,i} = [v_i(L) - v_i(0)]/[v_i(H) - v_i(0)]$, $i = 1, 2$. Without loss of generality, assume that $v_1(\cdot)$ and $v_2(\cdot)$ are such that $v_1(0) = v_2(0) = 0$ and $v_1(H) = v_2(H) = 1$, and therefore $\phi(0) = 0$ and $\phi(1) = 1$. Then $u_{L,i} = v_i(L)$. Note that $u_{L,2} \ge u_{L,1}$ because $v_2(L) = \phi(v_1(L)) \ge (1 - v_1(L))\phi(0) + v_1(L)\phi(1)$. If Proposer 1 prefers to issue an exploding offer, then by Proposition 1, $a_{\exp} \ge 0.5[r_{\mathrm{ext}} + (1 - r_{\mathrm{ext}})u_{L,1}]/[r_{\exp} + (1 - r_{\exp})u_{L,1}]$. From $u_{L,2} \ge u_{L,1}$ and $r_{\exp} < r_{\mathrm{ext}}$, $a_{\exp} \ge 0.5[r_{\mathrm{ext}} + (1 - r_{\mathrm{ext}})u_{L,2}]/[r_{\exp} + (1 - r_{\exp})u_{L,2}]$. $\square$

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Nelson Lau received his Ph.D. and M.Sc. degrees in decision sciences from INSEAD and his B.A. in economics and mathematics-statistics from Columbia University. His research interests cover behavioral operations management and decision analysis.

Yakov Bart is an assistant professor of marketing at INSEAD and holds a Ph.D. degree in business administration from the University of California, Berkeley. His areas of interest are competitive marketing strategy in various contexts and consumer decision making under risk.

J. Neil Bearden is an associate professor of decision sciences at INSEAD. He is interested in ethics and the peculiarities of human thought.

Ilia Tsetlin is an associate professor of decision sciences at INSEAD. His teaching and research interests are in modeling decisions under uncertainty, with a particular focus on decision making with multiple attributes, target-based and contest-based settings, and situations with background risk. Other research streams are related to negotiations, auction theory, stochastic dominance and collective choice. He is an associate editor for *Operations Research* and *Management Science* and a coordinating editor for *Theory and Decision*.