# EC.1. Supplemental Results Not Included In The Main Text

## EC.1.1. Flexibility as a Sorting Mechanism

The dynamics of cooperation above suggest that the flexibility to dissolve relationships in TBA should act as a sorting device, eventually leading to the matching of (conditional) cooperators with each other in (eventually) stable relationships and a separate pool of defectors. To investigate this, we compare the differences in subjects' reputation scores with their first and last match of a supergame. Specifically, for each (subject $i$, supergame $\tau$) pair, let $R_i^\tau$ be subject $i$'s reputation score at the **beginning** of supergame $\tau$.[21] Similarly, let $R_{j_1(i)}^\tau$ be the reputation of subject $i$'s first match at the **beginning** of supergame $\tau$. Finally, let $R_{j_T(i)}^\tau$ be the reputation at the **beginning** of supergame $\tau$ for subject $i$'s last match in supergame $\tau$. Hence, $|R_i^\tau - R_{j_1(i)}^\tau|$ is the difference in reputation scores between subject $i$ and her first match and $|R_i^\tau - R_{j_T(i)}^\tau|$ is the difference in reputation scores between subject $i$ and her last match in supergame $\tau$.[22] Using these metrics, we see in Table EC.1 that, under TBA, the absolute difference in reputation scores is significantly lower at the end versus the beginning of a supergame. This indicates that subjects generally end supergames matched with someone with a more similar reputation score than they began the supergame with, which is evidence that sorting occurs. For comparison purposes, under RM, there is no statistical difference as matchings are randomly selected in each period and under IBA, the numbers are exactly the same as subjects have only one match per supergame. We also note that the results are qualitatively the same if we break down further by reputation condition. We summarize the results of this section as follows:

**Result 3** *In the TBA matching institution, subjects are more likely to be matched with more similar counterparts in terms of cooperative behavior at the end of the supergame than at the beginning.*

## EC.1.2. Detailed Analysis of Average Future Payoffs

In Table EC.2(a) we report the average normalized payoffs until the end of the supergame depending on whether 0, 1 or 2 subjects in a matching cooperated and whether or not the matching was maintained in the current period.[23] In the absence of a reputation mechanism, regardless of the

[21] For the case of no reputation, we take the frequency of cooperation as our measure.

[22] We hold the reputation score fixed at the initial reputation at the **beginning** of the supergame so that difference cannot be due to changes in the reputation score throughout the supergame.

[23] The average future payoff from period $t$ is computed as: $\bar{\pi} = (1/T-t)\sum_{i=t+1}^{T} \pi_i$, where $T$ is the period in which the supergame ends. We then normalize this so that it is reported as the percentage of maximum gains from cooperation. That is, $\bar{\pi}^N = 100((\bar{\pi}-25)/(40-25))$.

**Table EC.1 Sorting and Matching Institution (Absolute Difference in Reputation Score Between Subject and Match)**

| | Absolute Difference in Rep Score | | $p-$value |
|---|---|---|---|
| Institution | First Period | Last Period | Signed-rank Test |
| RM | 0.161 | 0.161 | 0.859 |
| TBA | 0.301 | 0.260 | 0.018 |
| IBA | 0.291 | 0.291 | — |

**Table EC.2 Average Normalized Payoffs in Remainder of Supergame Conditional on Outcome in the Previous Period**

(a) (Normalized) Average Future Payoffs

| | None | | Objective | | Subjective | |
|---|---|---|---|---|---|---|
| Outcome Last Period | Dissolved | Maintained | Dissolved | Maintained | Dissolved | Maintained |
| $(D,D)$ | 12.91% | 14.40% | 26.72% | 39.62% | 21.01% | 17.27% |
| $(C,D)$ or $(D,C)$ | 13.02% | 42.50% | 51.22% | 49.04% | 33.36% | 35.96% |
| $(C,C)$ | 3.33%† | 96.78% | 51.45%† | 97.65% | 32.44%† | 94.65% |

† Recall from Table 4 that less than 1% of relationships dissolve following $(C,C)$. Hence, caution is warranted in these numbers.

(b) Marginal Effects (ME) of Reputation on Average Normalized Future Payoffs Depending on Outcome

| ME Computed At: | | | | | |
|---|---|---|---|---|---|
| Outcome | Matching | None | | Reputation | |
| $(D,D)$ | Dissolved | $-10.210$ | (7.199) | $30.117^{**}$ | (11.703) |
| $(D,D)$ | Maintained | $-1.855$ | (10.692) | 16.173 | (19.250) |
| $(C,D)$ or $(D,C)$ | Dissolved | $-21.190^{*}$ | (11.163) | $32.892^{***}$ | (9.423) |
| $(C,D)$ or $(D,C)$ | Maintained | $-1.071$ | (13.213) | 2.112 | (13.412) |
| $(C,C)$ | Dissolved | [Not estimable] | | 7.800 | (29.640) |
| $(C,C)$ | Maintained | 9.620 | (6.612) | 4.237 | (4.946) |

Note 1: In panel (b), the numbers in parentheses are bootstrapped standard errors.
Note 2: In panel (b), for the "None" column, we use the same reputation score as in the objective reputation mechanism. This was obviously not observable to subjects. Hence, the fact that we see differences between the "None" and "Reputation" columns supports our claim that reputation is driving the results.
Note 3: The marginal effects are derived from linear random-effects regressions where average normalized future payoffs was the dependent variable and we had indicators for number of subjects (0, 1 or 2) in the matching who cooperated, whether the matching was maintained and the reputation score of subjects, as well as a complete set of interaction terms.

outcome in the prisoner's dilemma phase, maintaining leads to higher payoffs than dissolving. Interestingly, this is true even if one or more subjects defected and it suggests that players would be better off trying to make a relationship work than to dissolve and be paired with a subject from the rematching pool. In contrast, in the presence of a reputation mechanism, average future payoffs are essentially identical whether the relationship is maintained or dissolved when one subject defects.

These aggregate level results from panel (a) reaffirm something we saw in Figure 3 – namely, that the rematching pool is more cooperative in the presence of a reputation mechanism. However, Table EC.2(b), which shows the marginal effects of reputation on average future payoffs, indicates that these results also depend on the subject's reputation. Looking first at the reputation column we see that, when either one or two subjects in a matching defect, subjects with a higher reputation earn

significantly more from dissolving the relationship compared to maintaining it.[24] This is because, in the next matching, the likelihood of starting cooperatively (i.e., $(C,C)$) is significantly increasing in one's reputation and once mutual cooperation starts, it is very likely to continue.

## EC.2. A Brief Analysis of Additional Treatments

### EC.2.1. TBA Institution Where Mutual Consent is Required to Dissolve a Relationship

One potential problem with the TBA institution as we implemented is that a player can unilaterally dissolve a relationship. Thus, in principle, a subject who defects could escape punishment by dissolving the relationship and take his/her chances in the matching pool.[25] To see whether cooperation was affected by this feature of the matching institution, we also conducted three sessions of what we call the TBA-M institution, where relationships can only be dissolved by mutual consent. As was the case with the TBA institution, at the end of every period, subjects chose whether to maintain or dissolve the relationship. If both subjects chose to maintain, then the relationship was maintained (provided the supergame did not exogenously terminate), if both subjects chose to dissolve, then the relationship would be dissolved and, finally, if one subject chose to dissolve and the other chose to maintain, then the latter subject would be given a chance to accept or deny the dissolution request. This treatment was implemented without a reputation mechanism

We hypothesize that by making it more difficult to escape punishments, subjects will be more likely to cooperate in this institution than in the baseline TBA institution. Indeed, while the overall cooperation rate was 39.11% in the TBA institution, it was 49.42% in the TBA-M institution. Unfortunately, given only 3 sessions per treatment, we are unable to say that the difference is statistically significant.

The requirement of mutual consent has a large effect on the frequency with which relationships are dissolved. While 44.16% (resp. 59.55%) of relationships dissolve when one (resp. both) players in a relationship defect in TBA, these numbers are 14.78% and 44.86% in TBA-M. Table EC.3 shows the frequency of dissolution requests, and whether they were accepted or denied. As can be seen from the table, a substantial fraction dissolution requests are denied. This could be indicative of a desire to punish, but it is also notable that when the cooperator in a match requests a dissolution,

[24] Note also that this is not simply due to cooperative subjects having a higher reputation and, therefore, earning more by dissolving. If this were so, then we would expect to see the same results if we used the subjects' unobservable reputation score (i.e., the frequency of cooperation as in the objective mechanism). Looking at the "None" column in panel (b), it is clear that the estimated marginal effects are very different from the reputation mechanism. Indeed, a highly cooperative subject in the absence of a reputation mechanism earns significantly less in the future when a relationship is dissolved following a defection by one player.

[25] As we saw, the matching pool is generally less cooperative, so such a subject cannot entirely escape some kind of "punishment".

the subject who defected is more than twice as likely to deny the request.[26] The other interesting result is that, conditional on at least one defection, subjects are over twice as likely to cooperate (31.4%) if nobody requests to dissolve the relationship than if a request to dissolve is made but denied (13.8%). Thus subjects are willing to forgive a defection, as long as nobody tries to escape the relationship, but when one subject tries to break the relationship, the request is frequently dissolved and, in the next period, frequently punished.

**Table EC.3 The Frequency of Dissolution Requests**

| | Outcome in Prisoner's Dilemma Phase | | |
|---|---|---|---|
| Who Requests Dissolution | $(C,C)$ | $(C,D)$ or $(D,C)$ | $(D,D)$ |
| Neither Subject | 100.00 | 59.35 | 28.21 |
| One Subject | 0.00 | | |
| Cooperator (Accepted) | n/a | 9.57 | |
| Cooperator (Denied) | n/a | 19.35 | |
| Defector (Accepted) | n/a | 1.52 | 23.12 |
| Defector (Denied) | n/a | 6.52 | 26.94 |
| Both Subjects | 0.00 | 3.70 | 21.73 |

### EC.2.2. TBA Institution With An Objective Reputation Mechanism That Resets

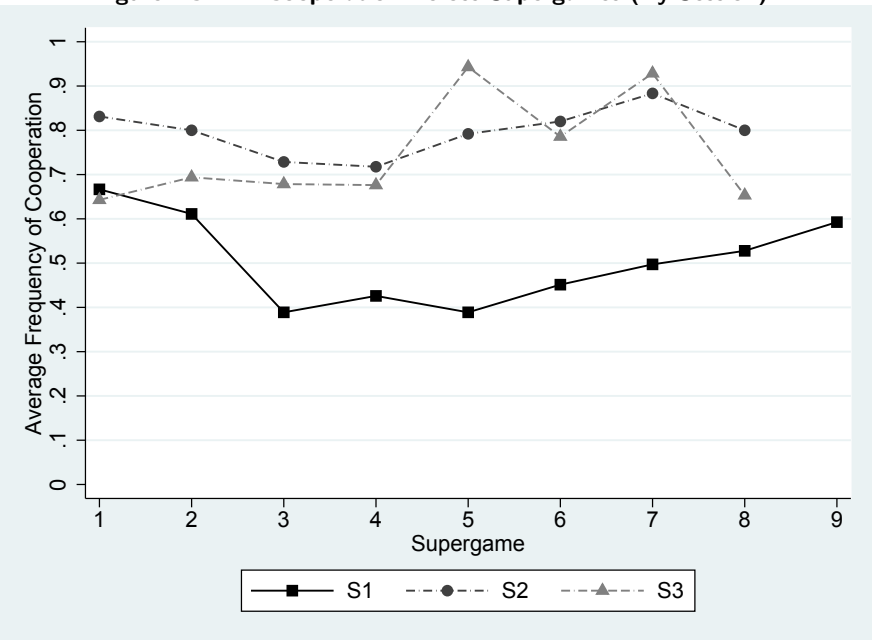
In addition to the two reputation mechanisms that we studied for our three matching institutions, we also studied behavior in the TBA institution with an objective reputation that would reset at the start of each supergame. Similar to Kamei and Putterman (2017), this allows us to examine whether subjects learn the value of maintaining a good reputation and cooperating. Specifically, because the reputations get reset at the start of each supergame a subject who defected frequently in the first supergame will not be saddled with a bad reputation in the second supergame, which should enable the subject to at least try to cooperate and build cooperative relationships.

First, observe that the average frequency of cooperation over all periods is 65.72%, which is approximately 68% higher than in the TBA institution without a reputation mechanism, and approximately equal to the overall cooperation rate in the IBA institution without a reputation mechanism but substantially less than the cooperation rate in the TBA institution with a long-lasting objective reputation. Thus, we can conclude that this mechanism facilitates cooperation in the TBA institution, though not as effectively as a long-lasting reputation.

In Figure EC.1 we plot the average frequency of cooperation for each supergame separately for each session. As can be seen, unlike Kamei and Putterman (2017), there is no clear upward trend in the frequency of cooperation across supergames. Indeed, in two sessions (S1 and S2), the

[26] Perhaps this is because the defector thinks he/she can take advantage of his/her match (because the match cooperated in the past and may do so again) or because the defector has a negative belief about the rematching pool.

**Figure EC.1 Cooperation Across Supergames (By Session)**




cooperation rate actually declines over the first three or four sessions before starting to increase. Therefore, at best, it takes subjects a non-trivial amount of time before they begin to realize the value of a good reputation.

## EC.3. Instructions for the Temporarily Binding Agreements (Unilateral) Treatment

Thank you for coming today. If you haven't already done so, please power off all mobile devices, tablets, computers, etc and put them in your bag or on the floor at your seat. This is an experiment on the economics of decision-making. Your earnings will depend partly on your decisions and partly on the decisions of others. By following the instructions and making careful decisions you will earn varying amounts of money, which will be paid at the end of the experiment. Details of how you will make decisions and earn money are explained below.

In this experiment, you will participate in a number of decision problems (rounds). In all rounds, you will be matched with another participant in the experiment but you will not know the identity of the other participants with whom you are matched throughout the experiment. In what follows, we will refer to the person with whom you are matched as your *match* and the two of you as a *pairing*. The experiment will last for a minimum of 75 rounds. More precise details will be given below.

### Decision Problem

In each round you and your match will simultaneously choose an action $A$ or $B$. The payoffs for each possible combination of actions is given in the table below:

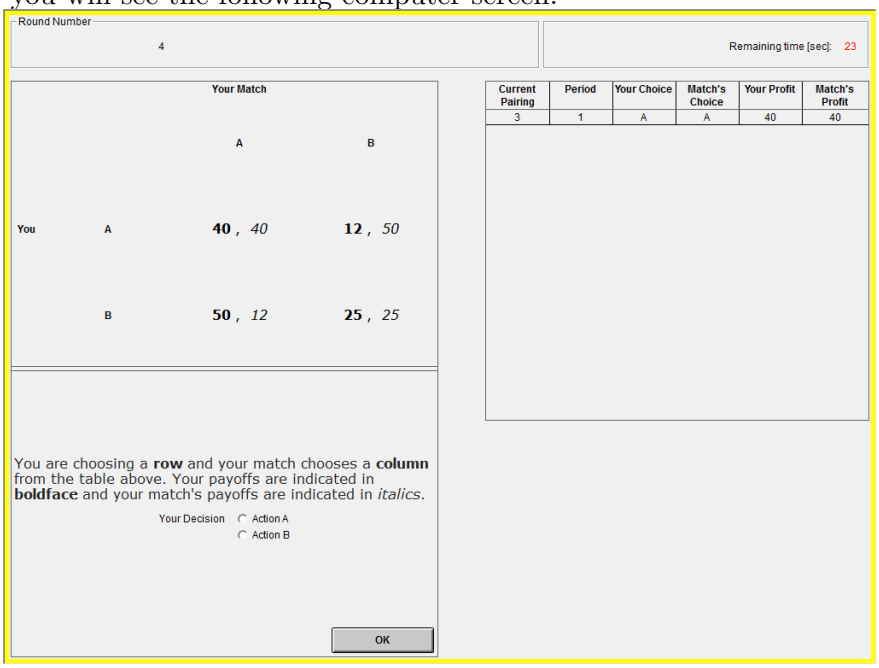
| | | Match's Choice | |
|---|---|---|---|
| Your Choice | | A | B |
| A | | **40**, *40* | **12**, *50* |
| B | | **50**, *12* | **25**, *25* |

The first entry in each cell (in bold) represents your payoff, while the second entry represents the payoff of the person you are matched with (in italics). As you can see, this shows the payoff associated with each choice. That is, if:

- You select **A** and your match selects **A**, you each make 40.
- You select **A** and your match selects **B**, you make 12 and your match makes 50.
- You select **B** and your match selects **A**, you make 50 and your match makes 12.
- You select **B** and your match selects **B**, you each make 25.

### The Computer Screen

In each round, you will see the following computer screen:

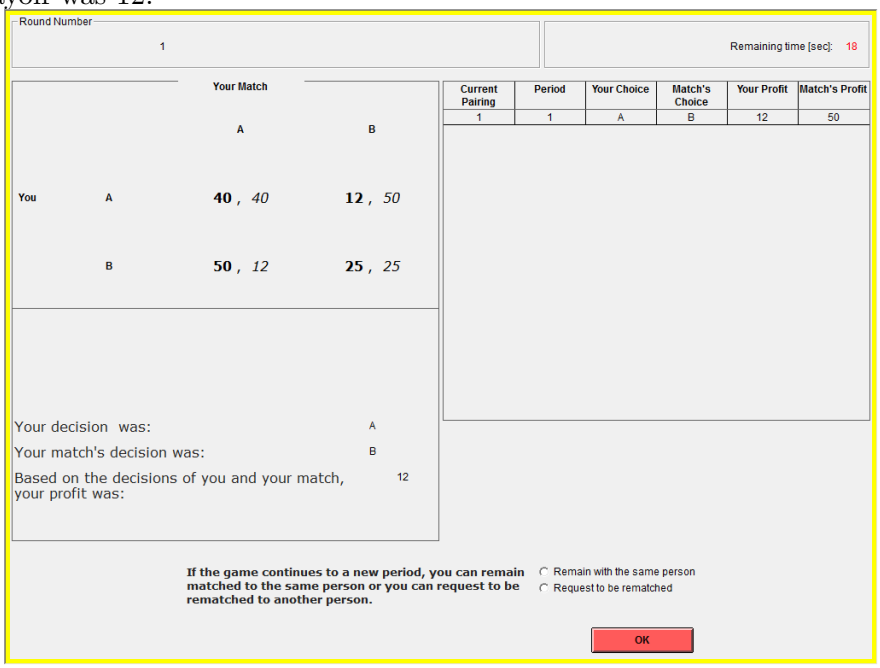



On the top-left side of the screen you will see the same payoff table as depicted above. On the top-right side of the screen you can see your and your match's previous choices as well as your profits for the current pairing. That is, you will not see any information regarding choices made or outcomes from any of your previous pairings. In the example above, you see that in the first period of the third pairing, you chose **A** and your match chose **A**, which gave you a payoff of 40 and your match a payoff of 40. On the bottom-left of the screen is where you will make your decision, i.e., either action A or action B.

### Payoffs

Your earnings in each round depend on your choice and on your match's choice. After both you and your match have made your choices, you will see the following screen. You see your choice,

your match's choice, and your profit. In this example, you see that you chose **A**, your match chose **B** and your payoff was 12.




## Pairings

At the end of every round, all participants have the option to remain matched with the same participant or to request to be rematched. If either you or your match request to be rematched, then your match for the next round will be chosen at random amongst all the participants in the experiment who either requested to be rematched or whose match requested to be rematched in the previous round.

In addition, at the end of every round, there is a 10% chance that the pairing between you and your match will **naturally** break-up. In this case, all participants will be rematched to a randomly chosen participant in the experiment and a new pairing will begin for everybody; that is, it is as if we roll a 10-sided die at the end of each round and the pairing breaks up if we roll a 1, and continues if we roll a 2, 3, . . . , 9 or 10.

Note that, absent a request for rematching, there is **always** a 90% chance that you will remain matched with the same subject in the next round. *It does not matter, for example, whether if its the first, fifth or twelfth round of your pairing; there is always a 90% chance that it will continue for one more round.*

Any time that you have been **rematched** to another participant, you will be explicitly told so; therefore, if no such announcement is made, it means you are still matched with the same participant.

## End of the Experiment

The experiment will end when the first pairing **after** 75 rounds have already been played **naturally** breaks up. Note that because of the 10% chance of a natural break-up, in any round after the 75th, you can expect the experiment to continue for approximately 10 more rounds.

At the end of the experiment, we will add all your earnings in order to determine your total points. This total will be converted to a dollar amount according to the rule:

$$\$1 = 175 \text{ points.}$$

This amount will then be added to the $4.00 participation fee to give your final payment. Payments will be made in private, in cash, after the completion of the experiment.

## Rules

Please do not talk with anyone during the experiment. We ask everyone to remain silent until the end of the last decision problem.

Your participation in the experiment and any information about your earnings will be kept strictly confidential. Your receipt of payment is the only place on which your name will appear. This information will be kept confidential.

If you have any questions please ask them now. If not, we will proceed to the experiment.