Framing in the games of competition

Aidas Masiliunas*[1] and Heinrich Nax*[2]

[1]Groupement de Recherche en Économie Quantitative d'Aix-Marseille (GREQAM) – Université de la Méditerranée - Aix-Marseille II, Université Paul Cézanne - Aix-Marseille III, École des Hautes Études en Sciences Sociales [EHESS], CNRS : UMR7316, Ecole des Hautes Etudes en Sciences Sociales (EHESS) – Centre de la Charité, 2 rue de la Charité, 13236 Marseille cedex 02, France
[2]ETH Zurich – Zurich, Switzerland

Abstract

Psychologists often run experiments in-context, while economists typically favor decontextualization (Smith, 1976). It is therefore surprising that some of the most important models of economic interaction have been almost exclusively implemented using very specific framing: in particular, games of price and quantity competition typically use market framing, while contest games use lottery framing. We conducted experiments of all three games to test how this framing affects decisions, and in particular whether the use of non-neutral framing can explain the gap between choices and theoretical predictions.
Experimental studies often find deviations from Nash equilibrium predictions in all three games (Sheremeta, 2013, Davis et al., 2003, Rassenti et al., 2000). Deviations in the direction of collusion could be explained by either altruism or by strategic behavior, especially when players interact repeatedly in a small group. However, both in contests and in oligopoly games behavior is typically found to be more competitive than predicted by NE. To explain such choices based on other-regarding preferences, players would need to have anti-social preferences which are rarely observed in other settings (Blanco et al., 2011, Murphy et al., 2011). Alternatively, competitive preferences could be context-specific and induced by the competitive nature of the game. Indeed, there is evidence that after playing a contest participants are less likely to cooperate in a prisoner's dilemma (Herrmann and Orzen, 2008) or to make a transfer to the members from the opposing team (Zaunbrecher et al., 2017). Whether it is the framing, the incentive structure or any other element of the game that is responsible for such change of behavior is unclear. In this paper we look specifically at framing, and find that neutral framing generally leads to less competitive choices, consistent with the prediction that preferences are context-specific.

Our experimental design summarizes as follows. In the games of strategic substitutes and complements we use a general payoff function introduced by Potters & Suetens (2009) and the parameters were chosen to make games comparable to the proportional rent-seeking contest. All three games have identical strategy spaces and share the locations and payoffs of the Nash equilibrium, joint profit maximization point and relative profit maximization point. Therefore, only the shape of the best-response function varies across games. In the baseline treatments the game was explained as it typically is in the literature: in the games of substitutes and complements the participants were described as quantity-setting firms; in contests the game was explained as competition for a prize. In neutral treatments players were informed that their payoffs depended on their action and on the action of the other

*Speaker

participant, without any additional explanation about the nature of the payoff function. In all treatments information about the payoff function was provided using a payoff table and a payoff calculator.

As predicted, we find that choices in treatments with standard framing choices are more competitive than with neutral framing, but the effect is driven only by the contest and complements games: neutral framing decreases the average choice in all rounds (first round) by 21% (32%) in contest, 59% (93%) in substitutes and 3.5% (-27%) in complements. In all three games the framing effect is most pronounced in the initial rounds, and decreases over time.

The context-dependent preference hypothesis predicts similar treatment effect in all three games, therefore it cannot explain the lack of effect in the game of strategic complements. However, such treatment ranking can be explained if framing influences behavior through beliefs rather than preferences; in particular, if players expect more spiteful opponents. We fit a hybrid model in which both preferences and beliefs are context-dependent, and find that MSD is minimized by a model in which framing operates mostly through beliefs, and through preferences to a lesser extent. Such a hybrid model can explain both the ranking of the games in each treatment and the magnitude of change in behavior because of neutral framing. The estimated parameter values suggest that with neutral framing players have slightly pro-social preferences and expect others to act pro-socially, but with standard framing both preferences and beliefs become anti-social. Models in which either only the beliefs or only the preferences are context-dependent fit data much worse.
Next, we look at whether competitive framing impedes convergence to the Nash equilibrium. We do find consistently higher convergence rates with neutral framing in the game of strategic complements and in contest, but the treatment difference is not statistically significant. There is nearly no effect in the game of strategic substitutes. We conclude that competitive framing can partly explain deviations from Nash equilibrium, although the effect size is stronger on initial choices. Framing mostly guides preferences and beliefs at the start of the game, but learning from feedback erodes the effect over time.