Do Roses Speak Louder than Words?
Signaling in Internet Dating Markets

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ABSTRACT

Many markets suffer from frictions and a potential lack of information about each other’s preferences. The emerging field of market design tries to understand when markets work well, and when they do not, and how to fix them in case they’re broken. Such exploits range from organizing centralized clearinghouses to ease problems of congestion, to organizing decentralized markets by affecting rules and norms about offers and acceptances, to providing platforms to exchange information. A more recent approach is to allow participants to provide signals that are cheap (in that they are not binding), but costly – in that they are limited in numbers. One example of signaling in matching markets is the U.S. market for college admission: In the US, there are two rounds of college admission, one is early (where applications are sent around October), and one is late (with applications sent at the end of December). The early rounds of applications have seen numerous changes in the past years, where a prominent feature is single-choice early action. A student can differentiate herself by selecting early action from other students who choose not to. In theory, this action can provide additional information on
her preferences to a university. Another example is market for assistant professors in economics in the U.S. Each job applicant can send a signal up to two potential employers whereas she can apply for as many jobs as she wants.

Evaluating whether the introduction of the signaling mechanism can improve efficiency of matching outcomes is an extremely challenging task. The difficulty stems from the fact that market participants are heterogeneous and information of market participants’ behaviors is limited. Consider US economics junior market mentioned earlier. Depending on an applicant’s major research area, the applicant may prefer a job offer from top 15th economics department to an offer from top 10th economics department. Under heterogeneous preferences, having a well-defined metric to compare outcomes with and without signaling mechanism is difficult. Moreover, even if we have a metric to evaluate outcomes, market conditions may vary by year, and thus we need additional information about what jobs an applicant applied, where the person got offers, and what job the person accepted. However, not all information is available to researchers.

We overcome this problem by using a field experiment. The experiment was designed as a special online dating event product and conducted by a major Korean matchmaking company in September 2008. It may be worth noting that this experiment setup is particularly useful for us for three reasons. First, we are able to collect a large range of information about participants and their behavior, compared to regular markets such as college admission and US econ job market. Second, marriage outcomes are important because they may affect duration of marriage, children’s outcome, inequality, and many dimensions that economists care about. Third, online dating market itself is an important market that has been rapidly growing over the world. For example, in the US, major dating companies have been established since mid 1990s and the market size is expected as $932 million in 2011 (JupiterResearch, 2007). Popularity of online dating services is observed not only in developed country but also in developing countries such as India and China.

Our experiment settings are the following: a participant can send a pre-made electronic note to ask for a first date (herein, proposal) up to 10 different participants. The participant is endowed with 2 electronic roses with 80 percent probability or with 8
electronic roses with 20 percent probability. A participant can attach only one rose to a proposal. For example, if a person is endowed with 2 roses and sends 10 first-date proposals, then she can select only two people out of ten for roses. At the time of participation, we advertise that an electronic rose is for those who a participant particularly prefers, in order to make participants perceive a rose as a signal of a sender’s preference. After the period when participants can send a proposal ends, then, each participant can see the list of people who sent a proposal with or without a rose to him or her, and decide whether to accept a proposal. If the participant received more than 10 proposals, he or she can accept up to 10.

We limit participants to be never married and aged from 26 to 38 for men and 22 to 34 for women to reduce heterogeneity. We have 613 participants (of which 304 are male). All participants are college educated (some with a master’s or Ph.D.) except of two men and two women who are only high school educated. Altogether 1921 proposals are made, of which 66% (1261) are made by men and 34% (660) by women. A total of 54.28% of men send a proposal, and conditional on sending a proposal, send on average 7.64. Among men who send a proposal, 53.94% exhaust their proposals and are potentially constrained by being able to only send 10 proposals. In comparison, only 36.89% of women send a proposal and conditional on sending a proposal, send only 5.79, and exhaust their proposals only with a 27.19% chance. Each of these differences is significant. Furthermore, male (but not female) participants who are treated with 8 roses are significantly more likely to make a proposal. While conditional on sending a proposal participants with 8 roses are slightly more active, the difference is not significant.

Overall, 55% of men receive at least one proposal compared to 73% of women. Women also receive significantly more proposals on average. In order to examine the effect of a participant’s characteristics on the likelihood of receiving a proposal, we use the participant’s “attractiveness index” assigned by the company. The index ranges from 0 to 100 and is intended to measure the extent to which a person should be attractive to the opposite sex as a spouse. This is done as the matchmaking company normally uses this information to propose matches between regular members. A weight assigned to each characteristic is based on surveys of the company's staff members who are experienced in assisting members. Note that the weights depend on sex and how the weights are
assigned remains the same during the periods that the dataset covers. We find that the higher index a person has, the more proposals the person received. On the contrary, attractiveness had no impact on the probability of sending a proposal.

We then examine who sent a proposal to whom. Senders of all attractiveness levels are more likely to make proposals to more attractive potential mates. Furthermore, the more attractive the sender, the more they propose to attractive mates. However, the overlap in proposals is still about 80% for both women and men. That is, 80% of proposals made by the least attractive participants are the same as 80% of proposals made by the most attractive participants. The larger diversification of men is visible in that men spread their proposals over a larger grouping of attractiveness, with a third of proposals sent at least to the middle group (defined as 31st to 70th percentile of the index) and a third to the top group (defined as 71st percentile and above). Women on the other hand always send at least half their proposals to the most attractive group of men.

As for use of roses, of the 1921 proposals, 670 have a rose attached. A total of 38.70% (488) of proposals made by men come with a rose, compared to 27.58% (182) of proposals by women. Conditioning on sending a proposal, 90.3 percent of men attach at least one rose, compared to 64.91 percent of women. Participants with two roses use on average 1.61 and 0.94 roses (for men and women, respectively), while those with 8 roses use 6.48 and 3.81 for men and women respectively. We find that the more attractive participants receive more number of roses. However, this is because they received more proposals and the fraction of proposals with a rose is not strongly correlated with a participant’s index.

Next, we examine the extent to which a rose affects a recipient’s decision. Attaching a rose increases the probability of being accepted by 8 percent if the recipient belongs to the medium group of attractiveness index. The effect is significant at 1 percent level. Male recipients respond more positively to a rose (11 percent) than female recipients (7 percent). In order to investigate this response to roses, we limit our analysis on each group of attractiveness index separately and examine the effect of roses depending on a sender’s type. We find that the middle group recipients respond more positively to a rose if it comes from the bottom or the top group, and the magnitude implies that a proposal from a bottom group sender with a rose is preferred to a proposal
from a middle group without a rose. However since the top group is highly preferred, attaching a rose does not make a bottom group sender preferred to the top group. For other groups of recipients, we did not find any statistically significant response to a rose.

Finally, we study the extent to which participants with 8 roses are better off compared to those with 2 roses. We use the fraction of proposals that are accepted by other participants as a measure of how successful a participant is. We find that female participants with 8 roses have 13 percentage points higher success rate than other female participants with 2 roses. The magnitude is statistically significant at 1 percent level.

REFERENCES


Avery, Christopher and Jonathan Levin, “Early Admissions at Selective Colleges,” March 2009, working paper.


