# THE VALUE OF RECIPROCITY IN ONLINE BARTER MARKETS: AN EMPIRICAL INVESTIGATION

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# Appendix A

## Propensity Score Matching

For each user, the propensity score of being an avid user (i.e., the treatment condition) is predicted using a logit regression on several key covariates, including whether the user provides a bio, whether the user provides a photo, how long the user has been in this market, the user's last login time, the user's country dummies, and the user's percentages of each book genre in her inventory list and wish list.  Because the bias in the estimated treatment effect tends to increase when increasing the number of untreated subjects matched to each treated subject in propensity score matching (Austin 2010), we choose one-to-one matching and identify a matching non-avid user in the control group for each avid user in the treatment group using nearest neighbor matching on the propensity score.  The distribution of propensity scores in both the treated group and the untreated group is shown in Figure A1.  We observe a significant overlap of propensity scores between the treated group and the untreated group, validating the common support assumption (Ho et al. 2007).  Therefore, treatment observations with propensity scores higher than the maximum or less than the minimum score of the controls are dropped by enforcing common support condition.
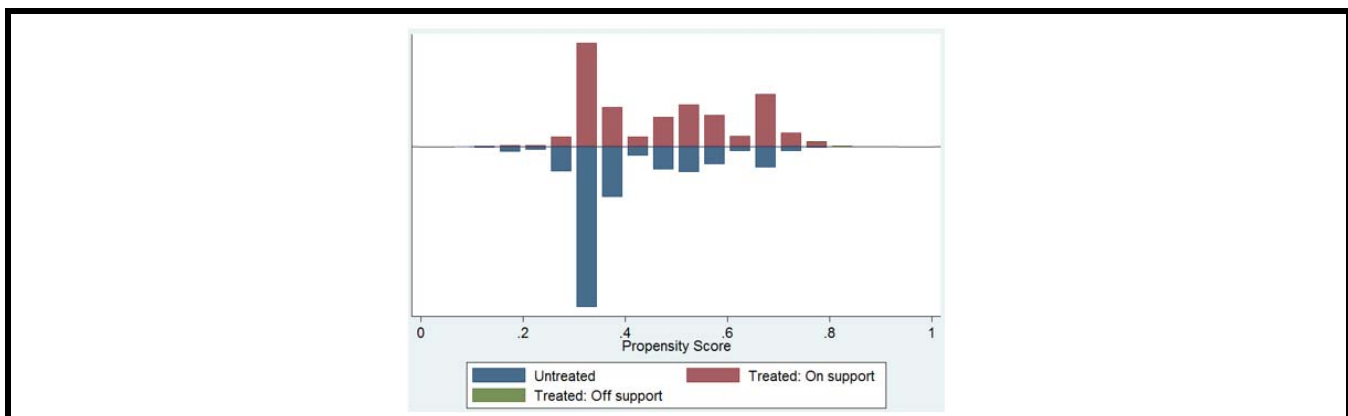


**Figure A1.  Distribution of Propensity Scores**

# Appendix B

## Summary Statistics and Correlation Tables

| Table B1.  Users with Reciprocal Partners Versus Users Without Reciprocal Partners | | Users with Reciprocal Partners | Users Without Reciprocal Partners | T-Value |
|---|---|---|---|---|
| User Characteristics | *ifBio* | 0.34 | 0.32 | 1.36 |
| | *ifPhoto* | 0.23 | 0.23 | 0.94 |
| | *ifUS* | 0.75 | 0.75 | 1.12 |
| | *tenure* | 25.90 | 25.48 | 1.74 |
| | *lastLogin* | 2.55 | 2.60 | 0.91 |
| User Inventory and Wish list Characteristics in the Top 3 Genres | *LiteraturePct* | 22.53% | 21.48% | 1.08 |
| | *RomancePct* | 11.58% | 11.42% | 0.35 |
| | *HealthPct* | 8.63% | 8.21% | 0.93 |
| User Exchange Characteristics | *give* | 131.78 | 32.16 | 54.61*** |
| | *receive* | 143.96 | 21.62 | 50.81*** |
| | *fbScoreLog* | 4.56 | 3.10 | 87.22*** |

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

| Table B2.  Summary Statistics of Variables for Partner Choice Model | | | | | |
|---|---|---|---|---|---|
| Variables | # of Obs. | Mean | Std. Dev. | Min | Max |
| (1)  *p_ifBio* | 2651383 | 0.31 | 0.46 | 0.00 | 1.00 |
| (2)  *p_ifPhoto* | 2651383 | 0.23 | 0.42 | 0.00 | 1.00 |
| (3)  *p_tenure* | 2651383 | 32.85 | 13.97 | 0.00 | 57.33 |
| (4)  *p_ifAvid* | 2651383 | 0.48 | 0.49 | 0.00 | 1.00 |
| (5)  *p_lastLogin* | 2651383 | 8.74 | 6.96 | 0.00 | 57.10 |
| (6)  *p_fbScoreLog* | 2651383 | 4.85 | 0.92 | 0.00 | 8.82 |
| (7)  *p_rejected* | 2651383 | 7.00 | 17.53 | 0.00 | 418.00 |
| (8)  *p_sentLost* | 2651383 | 2.98 | 8.49 | 0.00 | 184.00 |
| (9)  *p_receiveGiveRatio* | 2651383 | 1.13 | 2.43 | 0.00 | 8.72 |
| (10)  *ifReciprocal* | 2651383 | 0.01 | 0.08 | 0.00 | 1.00 |
| (11)  *tasteSimilarity* | 2651383 | 0.71 | 0.18 | 0.00 | 1.00 |
| (12)  *sharedGenre* | 2651383 | 19.76 | 9.19 | 0.00 | 33.00 |
| (13)  *p_focalDepthLog* | 2651383 | 2.49 | 1.38 | 0.00 | 9.17 |
| (14)  *p_sharedDepthLog* | 2651383 | 4.64 | 1.50 | 0.00 | 9.42 |
| (15)  *transToPartner* | 2651383 | 0.08 | 1.92 | 0.00 | 540.00 |
| (16)  *transFromPartner* | 2651383 | 0.13 | 3.52 | 0.00 | 540.00 |
| (17)  *pendingToPartner* | 2651383 | 0.00 | 0.15 | 0.00 | 32.00 |
| (18)  *pendingFromPartner* | 2651383 | 0.02 | 0.39 | 0.00 | 46.00 |
| (19)  *ifFriend* | 2651383 | 0.01 | 0.12 | 0.00 | 1.00 |
| (20)  *ifSameCountry* | 2651383 | 0.74 | 0.44 | 0.00 | 1.00 |
| (21)  *ifPartnerOfReci* | 2651383 | 0.02 | 0.18 | 0.00 | 1.00 |
| (22)  *ifChosen* | 2651383 | 0.05 | 0.21 | 0.00 | 1.00 |

| Table B3. Correlation Matrix of Variables for Partner Choice Model | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) |
| (1) | 1.00 | | | | | | | | | | | | | | | | | | | | | |
| (2) | **0.47** | 1.00 | | | | | | | | | | | | | | | | | | | | |
| (3) | **0.09** | **0.10** | 1.00 | | | | | | | | | | | | | | | | | | | |
| (4) | **0.27** | **0.25** | **0.05** | 1.00 | | | | | | | | | | | | | | | | | | |
| (5) | **0.07** | **0.08** | **0.27** | **0.04** | 1.00 | | | | | | | | | | | | | | | | | |
| (6) | **0.21** | **0.29** | **0.30** | **0.45** | **0.21** | 1.00 | | | | | | | | | | | | | | | | |
| (7) | **0.04** | **0.07** | **0.12** | **0.25** | **0.08** | **0.38** | 1.00 | | | | | | | | | | | | | | | |
| (8) | **0.03** | **0.04** | **0.10** | **0.24** | **0.07** | **0.31** | **0.39** | 1.00 | | | | | | | | | | | | | | |
| (9) | **0.00** | **0.01** | **0.01** | **0.03** | **0.01** | **-0.01** | **0.02** | **0.03** | 1.00 | | | | | | | | | | | | | |
| (10) | **0.05** | **0.05** | **0.01** | **0.08** | **0.01** | **0.14** | **0.05** | **0.04** | **0.11** | 1.00 | | | | | | | | | | | | |
| (11) | **0.10** | **0.09** | **0.02** | **0.25** | -0.01 | **0.26** | **0.10** | **0.09** | 0.00 | **0.07** | 1.00 | | | | | | | | | | | |
| (12) | **0.21** | **0.19** | **0.09** | **0.26** | **0.04** | **0.34** | **0.21** | **0.19** | 0.01 | **0.08** | **0.43** | 1.00 | | | | | | | | | | |
| (13) | **0.18** | **0.17** | **0.19** | **0.27** | **0.13** | **0.43** | **0.33** | **0.29** | 0.01 | **0.09** | **0.27** | **0.45** | 1.00 | | | | | | | | | |
| (14) | **0.27** | **0.25** | **0.21** | **0.34** | **0.14** | **0.38** | **0.41** | **0.36** | 0.02 | **0.11** | **0.44** | **0.48** | **0.40** | 1.00 | | | | | | | | |
| (15) | **0.03** | **0.02** | **0.01** | **0.04** | **0.01** | **0.07** | **0.02** | **0.02** | 0.00 | **0.32** | **0.04** | **0.04** | **0.04** | **0.05** | 1.00 | | | | | | | |
| (16) | **0.03** | **0.02** | **0.01** | **0.03** | **0.01** | **0.07** | **0.02** | **0.02** | 0.00 | **0.29** | **0.03** | **0.04** | **0.04** | **0.05** | **0.45** | 1.00 | | | | | | |
| (17) | **0.01** | 0.00 | -0.00 | **0.01** | 0.00 | **0.03** | 0.00 | **0.01** | 0.00 | **0.10** | **0.01** | **0.02** | **0.01** | **0.02** | **0.32** | **0.18** | 1.00 | | | | | |
| (18) | **0.02** | **0.02** | **-0.03** | **0.03** | -0.01 | **0.06** | 0.01 | 0.01 | -0.00 | **0.16** | **0.03** | **0.04** | **0.04** | **0.05** | **0.21** | **0.36** | **0.22** | 1.00 | | | | |
| (19) | **0.01** | **0.01** | 0.00 | **0.09** | **0.02** | **0.08** | 0.01 | 0.01 | 0.01 | **0.17** | **0.09** | **0.02** | **0.04** | **0.19** | **0.20** | 0.00 | 0.00 | **-0.01** | 1.00 | | | |
| (20) | **-0.04** | **-0.04** | **-0.01** | **0.11** | -0.00 | **0.03** | **0.03** | **0.02** | -0.01 | 0.01 | **0.11** | **0.06** | **0.04** | **0.06** | -0.00 | -0.01 | -0.00 | -0.00 | **0.18** | 1.00 | | |
| (21) | **0.06** | **0.05** | **0.01** | **0.19** | **0.01** | **0.17** | **0.04** | **0.05** | **0.12** | **-0.45** | **0.03** | **0.12** | **0.16** | **0.01** | **0.01** | **-0.02** | **0.04** | 0.00 | **0.22** | **0.12** | 1.00 | |
| (22) | **0.03** | **0.02** | **-0.17** | **0.04** | **-0.08** | **0.04** | -0.01 | -0.02 | -0.01 | **0.09** | **0.04** | **0.05** | **0.02** | **0.05** | **0.07** | **0.09** | **0.05** | **0.23** | **0.14** | **0.04** | **0.05** | 1.00 |

**Bold**: Correlations significant at $p < 0.05$ level.

| Table B4.  Summary Statistics of Variables for Model (4) | | | | | |
|---|---|---|---|---|---|
| **Variables** | **# of Obs.** | **Mean** | **Std. Dev.** | **Min** | **Max** |
| (1)  *p_ifBio* | 93915 | 0.47 | 0.499 | 0.00 | 1.00 |
| (2)  *p_ifPhoto* | 93915 | 0.34 | 0.472 | 0.00 | 1.00 |
| (3)  *p_tenure* | 93915 | 20.16 | 50.23 | 0.00 | 57.33 |
| (4)  *p_ifAvid* | 93915 | 0.76 | 0.43 | 0.00 | 1.00 |
| (5)  *p_lastLogin* | 93915 | 0.85 | 1.42 | 0.00 | 2.58 |
| (6)  *p_fbScoreLog* | 93915 | 5.12 | 1.19 | 0.00 | 8.16 |
| (7)  *p_rejected* | 93915 | 8.06 | 17.23 | 0.00 | 317.00 |
| (8)  *p_sentLost* | 93915 | 2.90 | 6.39 | 0.00 | 99.00 |
| (9)  *p_receiveGiveRatio* | 93915 | 1.09 | 0.43 | 0.02 | 8.50 |
| (10)  *ifReciprocal* | 93915 | 0.16 | 0.23 | 0.00 | 1.00 |
| (11)  *tasteSimilarity* | 93915 | 0.77 | 0.16 | 0.00 | 0.99 |
| (12)  *sharedGenre* | 93915 | 24.24 | 7.56 | 0.00 | 33.00 |
| (13)  *p_focalDepthLog* | 93915 | 3.21 | 1.58 | 0.00 | 9.06 |
| (14)  *p_sharedDepthLog* | 93915 | 3.42 | 1.61 | 0.00 | 9.26 |
| (15)  *transToPartner* | 93915 | 1.90 | 17.27 | 0.00 | 447.00 |
| (16)  *transFromPartner* | 93915 | 0.83 | 7.78 | 0.00 | 540.00 |
| (17)  *pendingToPartner* | 93915 | 0.51 | 1.89 | 0.00 | 46.00 |
| (18)  *pendingFromPartner* | 93915 | 0.04 | 0.73 | 0.00 | 31.00 |
| (19)  *ifFriend* | 93915 | 0.19 | 0.35 | 0.00 | 1.00 |
| (20)  *ifSameCountry* | 93915 | 0.82 | 0.39 | 0.00 | 1.00 |
| (21)  *priceLog* | 93915 | 0.52 | 2.06 | 0.69 | 6.53 |
| (22)  *numChoices* | 93915 | 21.51 | 42.83 | 1.00 | 850.00 |
| (23)  *ifBio* | 93915 | 0.43 | 0.50 | 0.00 | 1.00 |
| (24)  *ifPhoto* | 93915 | 0.32 | 0.47 | 0.00 | 1.00 |
| (25)  *ifAvid* | 93915 | 0.73 | 0.37 | 0.00 | 1.00 |
| (26)  *tenure* | 93915 | 27.57 | 14.64 | 3.00 | 57.33 |
| (27)  *fbScoreLog* | 93915 | 5.41 | 0.95 | 3.61 | 8.17 |
| (28)  *rejected* | 93915 | 8.27 | 17.57 | 0.00 | 237.00 |
| (29)  *sentLost* | 93915 | 3.05 | 7.38 | 0.00 | 99.00 |
| (30)  *numPending* | 93915 | 6.42 | 16.32 | 0.00 | 74.00 |
| (31)  *ifReject* | 93915 | 0.05 | 0.21 | 0.00 | 1.00 |
| (32)  *mailSpeed* | 89491 | 8.53 | 15.04 | 0.00 | 64.00 |

## Table B5.  Correlation Matrix of Variables for Model (4)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (2) | 0.42 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (3) | 0.15 | 0.13 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (4) | 0.02 | 0.02 | -0.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (5) | 0.09 | 0.11 | 0.30 | 0.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (6) | 0.18 | 0.18 | 0.12 | 0.07 | 0.30 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (7) | 0.06 | 0.06 | 0.10 | 0.02 | 0.13 | 0.42 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| (8) | 0.07 | 0.03 | 0.08 | -0.00 | 0.15 | 0.46 | 0.47 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| (9) | 0.13 | 0.12 | 0.01 | 0.03 | 0.15 | 0.25 | 0.07 | 0.18 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | |
| (10) | 0.06 | 0.07 | 0.01 | 0.13 | 0.04 | 0.23 | 0.09 | 0.10 | 0.12 | 1.00 | | | | | | | | | | | | | | | | | | | | | | |
| (11) | 0.04 | 0.03 | 0.03 | 0.18 | 0.04 | 0.22 | 0.06 | 0.07 | 0.13 | 0.16 | 1.00 | | | | | | | | | | | | | | | | | | | | | |
| (12) | 0.11 | 0.12 | 0.07 | 0.37 | 0.11 | 0.49 | 0.18 | 0.16 | 0.17 | 0.17 | 0.46 | 1.00 | | | | | | | | | | | | | | | | | | | | |
| (13) | 0.11 | 0.12 | 0.10 | 0.09 | 0.16 | 0.48 | 0.33 | 0.22 | 0.22 | 0.19 | 0.30 | 0.41 | 1.00 | | | | | | | | | | | | | | | | | | | |
| (14) | 0.11 | 0.11 | 0.10 | 0.11 | 0.16 | 0.46 | 0.32 | 0.32 | 0.21 | 0.19 | 0.32 | 0.43 | 0.58 | 1.00 | | | | | | | | | | | | | | | | | | |
| (15) | 0.05 | 0.04 | 0.02 | 0.06 | 0.03 | 0.16 | 0.06 | 0.07 | 0.09 | 0.36 | 0.08 | 0.09 | 0.11 | 0.11 | 1.00 | | | | | | | | | | | | | | | | | |
| (16) | 0.04 | 0.02 | 0.02 | 0.06 | 0.07 | 0.13 | 0.03 | 0.05 | 0.08 | 0.39 | 0.09 | 0.08 | 0.09 | 0.09 | 0.45 | 1.00 | | | | | | | | | | | | | | | | |
| (17) | 0.07 | 0.04 | -0.00 | 0.09 | 0.01 | 0.18 | 0.06 | 0.06 | 0.08 | 0.24 | 0.08 | 0.14 | 0.15 | 0.16 | 0.39 | 0.26 | 1.00 | | | | | | | | | | | | | | | |
| (18) | 0.03 | -0.01 | 0.00 | 0.03 | 0.04 | 0.06 | 0.00 | 0.02 | 0.03 | 0.16 | 0.04 | 0.04 | 0.04 | 0.04 | 0.19 | 0.45 | 0.26 | 1.00 | | | | | | | | | | | | | | |
| (19) | 0.02 | 0.01 | 0.01 | 0.02 | 0.01 | 0.09 | 0.02 | 0.03 | 0.01 | 0.31 | 0.21 | 0.13 | 0.04 | 0.05 | 0.26 | 0.25 | 0.01 | 0.01 | 1.00 | | | | | | | | | | | | | |
| (20) | -0.07 | -0.06 | 0.18 | -0.03 | 0.04 | -0.00 | 0.04 | 0.02 | -0.08 | -0.05 | 0.09 | 0.04 | 0.06 | 0.06 | -0.08 | -0.05 | -0.07 | -0.02 | 0.18 | 1.00 | | | | | | | | | | | | |
| (21) | 0.03 | 0.03 | -0.01 | -0.09 | 0.03 | 0.03 | 0.02 | 0.06 | 0.05 | 0.01 | -0.02 | -0.05 | -0.03 | -0.03 | 0.01 | 0.02 | -0.02 | 0.00 | 0.00 | -0.05 | 1.00 | | | | | | | | | | | |
| (22) | -0.04 | -0.02 | -0.01 | -0.05 | -0.04 | -0.14 | -0.05 | -0.05 | -0.06 | -0.05 | -0.05 | -0.09 | -0.15 | -0.15 | -0.03 | -0.02 | -0.04 | -0.01 | -0.02 | 0.02 | -0.11 | 1.00 | | | | | | | | | | |
| (23) | 0.03 | 0.03 | -0.03 | 0.17 | -0.01 | 0.03 | 0.00 | 0.00 | 0.04 | 0.09 | 0.05 | 0.12 | 0.02 | 0.03 | 0.07 | 0.06 | 0.05 | 0.04 | 0.06 | -0.12 | 0.00 | -0.03 | 1.00 | | | | | | | | | |
| (24) | 0.03 | 0.03 | -0.02 | 0.16 | -0.00 | 0.03 | 0.01 | 0.01 | 0.04 | 0.09 | 0.05 | 0.12 | 0.01 | 0.02 | 0.06 | 0.03 | 0.03 | 0.00 | 0.05 | -0.10 | 0.01 | -0.02 | 0.43 | 1.00 | | | | | | | | |
| (25) | 0.10 | 0.10 | -0.01 | 0.06 | 0.05 | 0.54 | 0.17 | 0.17 | 0.35 | 0.10 | 0.19 | 0.37 | 0.41 | 0.40 | 0.05 | 0.05 | 0.09 | 0.02 | 0.04 | -0.03 | 0.01 | -0.09 | 0.03 | 0.02 | 1.00 | | | | | | | |
| (26) | 0.01 | 0.02 | 0.01 | 0.04 | 0.03 | 0.03 | 0.01 | 0.01 | 0.01 | 0.07 | 0.07 | 0.15 | 0.02 | 0.03 | 0.06 | 0.06 | 0.00 | 0.02 | 0.03 | -0.04 | 0.02 | -0.03 | 0.10 | 0.11 | 0.00 | 1.00 | | | | | | |
| (27) | 0.04 | 0.03 | 0.00 | 0.16 | 0.02 | 0.12 | 0.04 | 0.02 | 0.05 | 0.26 | 0.20 | 0.46 | 0.13 | 0.15 | 0.16 | 0.15 | 0.18 | 0.08 | 0.20 | -0.04 | -0.07 | -0.09 | 0.22 | 0.21 | 0.08 | 0.38 | 1.00 | | | | | |
| (28) | 0.01 | 0.01 | 0.01 | 0.19 | 0.01 | 0.05 | 0.01 | 0.01 | 0.01 | 0.08 | 0.07 | 0.18 | 0.06 | 0.07 | 0.03 | 0.03 | 0.05 | 0.01 | 0.05 | 0.04 | -0.06 | -0.04 | 0.06 | 0.08 | 0.03 | 0.22 | 0.47 | 1.00 | | | | |
| (29) | 0.01 | 0.01 | 0.01 | 0.19 | 0.01 | 0.05 | 0.01 | 0.02 | 0.01 | 0.10 | 0.07 | 0.16 | 0.04 | 0.05 | 0.04 | 0.06 | 0.07 | 0.05 | 0.07 | 0.01 | -0.01 | -0.03 | 0.08 | 0.01 | 0.02 | 0.21 | 0.49 | 0.52 | 1.00 | | | |
| (30) | 0.03 | 0.02 | -0.00 | 0.14 | 0.01 | 0.07 | 0.03 | 0.02 | 0.03 | 0.13 | 0.05 | 0.16 | 0.05 | 0.06 | 0.12 | 0.13 | 0.29 | 0.14 | 0.09 | -0.05 | -0.02 | -0.03 | 0.04 | -0.00 | 0.04 | 0.06 | 0.32 | 0.09 | 0.27 | 1.00 | | |
| (31) | -0.00 | -0.01 | 0.00 | -0.09 | -0.00 | -0.03 | -0.00 | -0.00 | -0.02 | -0.03 | -0.04 | -0.07 | -0.03 | -0.03 | -0.02 | -0.02 | -0.04 | -0.01 | -0.05 | 0.01 | 0.02 | 0.02 | -0.05 | -0.04 | -0.02 | -0.00 | -0.10 | 0.06 | 0.01 | -0.04 | 1.00 | |
| (32) | 0.01 | 0.01 | -0.03 | -0.00 | 0.01 | -0.01 | -0.01 | -0.00 | 0.01 | -0.05 | -0.02 | 0.00 | -0.01 | -0.01 | 0.09 | 0.14 | 0.06 | 0.06 | -0.06 | -0.11 | 0.00 | -0.01 | 0.02 | 0.00 | -0.01 | 0.01 | -0.02 | 0.01 | 0.04 | 0.14 | - | 1.00 |

**Bold**: Correlations significant at $p < 0.05$ level.

# Appendix c

## Examining the Formation of Reciprocal Relationships ▐

We compare an individual's reciprocal partners with her nonreciprocal partners in terms of their profiles and exchange activities to understand what makes two individuals develop a reciprocal relationship. The results are shown in Table C1. For a given individual, a reciprocal partner is not different from a nonreciprocal partner in terms of basic profiles and overall exchange activities. However, reciprocal partners are more similar to the focal individual in book tastes than her nonreciprocal partners. Indeed, two users with similar tastes are more likely to be reciprocal because one party is more likely to have the book the other party wants and vice versa.

| Table C1. Reciprocal Partner Versus Nonreciprocal Partner | | Reciprocal Partner | Nonreciprocal Partner | T-Value |
|---|---|---|---|---|
| Partner Characteristics | p_ifBio | 0.31 | 0.29 | 1.04 |
| | p_ifPhoto | 0.25 | 0.24 | 0.72 |
| | p_tenure | 26.86 | 27.01 | 1.35 |
| | p_lastLogin | 4.48 | 4.52 | 1.42 |
| | ifSameCountry | 0.75 | 0.75 | 0.25 |
| Partner Exchange Characteristics | p_give | 112.71 | 106.14 | 1.55 |
| | p_receive | 128.91 | 121.86 | 1.22 |
| | p_fbScoreLog | 3.95 | 3.92 | 0.77 |
| Book Taste Similarity Measures | tasteSimilarity | 0.81 | 0.74 | 17.11*** |
| | sharedGenre | 27.45 | 23.16 | 20.67*** |

$*p < 0.05$, $**p < 0.01$, $***p < 0.001$

We also econometrically examine what factors lead an existing nonreciprocal relationship to become reciprocal. For each nonreciprocal pair by November 1, 2010, we observe whether it has changed to be reciprocal or not on April 30, 2011. Therefore, we first employ a logistic regression to examine if similarity in book tastes helps explain the formation of a reciprocal relationship after controlling for the dyad's other properties, including similarity in the two individuals' site profiles, if the two individuals come from the same country, and the past transactions between the two individuals. The estimation result is shown in column (1) of Table C2. All the coefficients of variables relating to similarity in the dyad's basic profiles and reputation measures are insignificant. However, the coefficients of *tasteSimilarity* and *sharedGenre* are significant and positive, suggesting that nonreciprocal dyads with higher similarity in book tastes are more likely to become reciprocal later on.

Because the observation of the transition from a nonreciprocal relationship to a reciprocal relationship is censored, we also use the Cox proportional hazard model to estimate the hazard of becoming reciprocal *h(t)*. The result is shown in column (2)of Table C2. The hazard ratios of *tasteSimilarity* and *sharedGenre* are significant and greater than 1.0. This indicates that sharing higher similarity in book tastes increases the odds of becoming reciprocal.

| Table C2.  Analysis of Change in Relationship from Nonreciprocal to Reciprocal | | | | |
|---|---|---|---|---|
| | **Dependent Variable:** | | | |
| | ***ifReciprocal*** | | ***h(t)*** | |
| **Model** | **(1)**<br>**Logit Model** | | **(2)**<br>**Cox Proportional Hazard Model** | |
| Variables | **Coeff.** | **Std. Err.** | **Haz. Ratio** | **Std. Err.** |
| *Constant* | -3.987*** | (0.164) | | |
| *\| if_Bio - p_ifBio \|* | -0.047 | (0.039) | 0.976 | (0.065) |
| *\| if_photo - p_ifPhoto \|* | -0.031 | (0.038) | 1.020 | (0.068) |
| *\| tenure - p_tenure \|* | 0.001 | (0.002) | 0.921 | (0.004) |
| *\| fbScoreLog - p_fbScoreLog \|* | -0.031 | (0.027) | 0.915 | (0.041) |
| *\| rejected - p_rejected \|* | 0.001 | (0.001) | 0.999 | (0.001) |
| *\| sentLost - p_sentLost \|* | 0.001 | (0.002) | 0.999 | (0.004) |
| *\| receiveGiveRatio - p_receiveGiveRatio \|* | -0.023 | (0.014) | 0.995 | (0.004) |
| *ifSameCountry* | -0.000 | (0.045) | 1.017 | (0.096) |
| *tasteSimilarity* | 2.138*** | (0.133) | 48.61*** | (12.97) |
| *sharedGenre* | 0.037*** | (0.003) | 1.952*** | (0.004) |
| *transToPartner + transFromPartner* | 0.034*** | (0.004) | 1.034*** | (0.002) |
| # of Obs. / Exchanges | 43748 | | 43748 | |
| Log likelihood | -10759.26 | | -9569.88 | |
| LR chi² | 521.67 | | 602.89 | |
| Prob > chi² | 0.00 | | 0.00 | |

$*p < 0.05$, $**p < 0.01$, $***p < 0.001$

Overall, the analyses suggest that higher taste similarity between a pair leads to higher possibility that the partners in the pair will become reciprocal.  Based on the logit model, the odds of becoming reciprocal increases by 23.84% if the taste similarity between the two partners increases by 0.1 (e.g., from 0.5 to 0.6), and the odds of becoming reciprocal increases by 53.36% if the taste similarity between the two partners increases by 0.2 (e.g., from 0.5 to 0.7).  According to the results of cox proportional model, when other covariates are at the mean level, an increase of taste similarity by 0.1 (e.g., from 0.5 to 0.6) leads to an increase of the likelihood of the pair becoming reciprocal by 47.40%, and an increase of taste similarity by 0.2 (e.g., from 0.5 to 0.7) leads to an increase of the likelihood of the pair becoming reciprocal by 77.42%.

# Appendix D

## Coarsened Exact Matching

| Table D1.  Matching Criteria in CEM | | | |
|---|---|---|---|
| **Covariate** | **Description** | **# of Categories** | **Categories** |
| *ifBio* | If the user provides a bio | 2 | 0, 1 |
| *ifPhoto* | If the user provides a photo | 2 | 0, 1 |
| *tenure* | Number of months since the user joined the market | 9 | < 6, 6–12, 12–18, 18–24, 24–30, 30–36, 36–42, 42–48, > 48 |
| *lastLogin* | How many months ago was the user's last login time | 5 | < 2, 2–5, 5–8, 8–10, > 10 |
| *countryDummies* | 53 dummy variables for each country that the user may be from | 2 | 0, 1 |
| *LiteraturePct* | The user's percentage of books in Literature based on her inventory list and wish list | 7 | < 5%, 5%–10%,10%–20%, 20%–30%, 30%–40%, 40%–50%, > 50% |
| *RomancePct* | The user's percentage of books in Romance based on her inventory list and wish list | 7 | < 5%, 5%–10%,10%–20%, 20%–30%, 30%–40%, 40%–50%, > 50% |
| *HealthPct* | The user's percentage of books in Health based on her inventory list and wish list | 7 | < 5%, 5%–10%,10%–20%, 20%–30%, 30%–40%, 40%–50%, > 50% |

**Note**:  33 covariates about the user's percentage of books in other book genres are used in CEM but not reported here due to space limit.

**Table D2.  Analysis of Choosing Exchange Partners from Potential Choices by CEM Matched Users**

| | Dependent Variable: *ifChosen* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | (1) Full Sample | | (2) Avid: Sample with Reciprocal Choices | | (3) Avid: Sample w/o Reciprocal Choices | | (4) Non-Avid: Sample with Reciprocal Choices | | (5) Non-Avid: Sample w/o Reciprocal Choices | |
| Variables | Coeff. | Std. Err. | Coeff. | Std. Err. | Coeff. | Std. Err. | Coeff. | Std. Err. | Coeff. | Std. Err. |
| *p_ifBio* | 0.099*** | (0.009) | 0.059* | (0.029) | 0.101*** | (0.011) | -0.114 | (0.216) | 0.118*** | (0.023) |
| *p_ifPhoto* | 0.072*** | (0.010) | 0.047 | (0.031) | 0.085*** | (0.011) | 0.364 | (0.214) | 0.030 | (0.025) |
| *p_tenure* | -0.048*** | (0.000) | -0.045*** | (0.001) | -0.048*** | (0.000) | -0.047*** | (0.008) | -0.052*** | (0.001) |
| *p_ifAvid* | 0.003 | (0.012) | 0.042 | (0.042) | 0.026 | (0.015) | -0.095 | (0.292) | 0.034 | (0.030) |
| *p_lastLogin* | -0.004*** | (0.000) | -0.003*** | (0.000) | -0.002*** | (0.000) | -0.004*** | (0.000) | -0.004*** | (0.000) |
| *p_fbScoreLog* | 0.162*** | (0.011) | 0.113*** | (0.033) | 0.140*** | (0.013) | 0.592** | (0.255) | 0.192*** | (0.027) |
| *p_rejected* | -0.004*** | (0.000) | -0.004*** | (0.001) | -0.004*** | (0.000) | -0.004* | (0.002) | -0.004*** | (0.001) |
| *p_sentLost* | -0.015*** | (0.001) | -0.013*** | (0.002) | -0.015*** | (0.001) | -0.072** | (0.026) | -0.018*** | (0.002) |
| *p_receiveGiveRatio* | -0.347*** | (0.009) | -0.301*** | (0.028) | -0.348*** | (0.010) | -0.292** | (0.107) | -0.366*** | (0.022) |
| *ifReciprocal* | 0.309 | (0.238) | 0.613*** | (0.036) | — | | 0.205 | (0.426) | — | |
| *tasteSimilarity* | 0.085 | (0.079) | 0.276** | (0.111) | 0.087* | (0.041) | -0.376 | (0.744) | -0.073 | (0.082) |
| *sharedGenre* | 0.003 | (0.003) | 0.011*** | (0.004) | 0.011*** | (0.001) | 0.031 | (0.028) | 0.001 | (0.003) |
| *p_focalDepthLog* | 0.016 | (0.015) | -0.010 | (0.020) | -0.003 | (0.007) | -0.044 | (0.142) | -0.015 | (0.016) |
| *p_sharedDepthLog* | 0.016 | (0.017) | 0.082** | (0.031) | 0.128*** | (0.011) | -0.161 | (0.199) | 0.016 | (0.022) |
| *ifAvid * ifReciprocal* | 0.826*** | (0.239) | — | | — | | — | | — | |
| *ifAvid * tasteSimilarity* | 0.189* | (0.088) | — | | — | | — | | — | |
| *ifAvid * sharedGenre* | 0.001 | (0.003) | — | | — | | — | | — | |
| *ifAvid * p_focalDepthLog* | 0.023 | (0.017) | — | | — | | — | | — | |
| *ifAvid * p_sharedDepthLog* | 0.036* | (0.017) | — | | — | | — | | — | |
| *transToPartner* | 0.001 | (0.002) | 0.004* | (0.002) | 0.075*** | (0.010) | -0.239 | (0.158) | 0.036 | (0.053) |
| *transFromPartner* | 0.020*** | (0.002) | 0.010*** | (0.002) | 0.094*** | (0.006) | 0.053 | (0.121) | 0.037 | (0.047) |
| *pendingToPartner* | 0.369*** | (0.039) | 0.177*** | (0.041) | 0.589*** | (0.062) | -0.039 | (0.602) | 0.398* | (0.186) |
| *pendingFromPartner* | 2.655*** | (0.023) | 1.610*** | (0.035) | 2.991*** | (0.030) | 1.728*** | (0.566) | 3.733*** | (0.099) |
| *ifFriend* | 1.215*** | (0.272) | 1.301*** | (0.186) | 0.868*** | (0.235) | 3.497*** | (0.358) | 1.332*** | (0.187) |
| *ifSameCountry* | 1.519*** | (0.020) | 1.497*** | (0.061) | 1.515*** | (0.024) | 1.175*** | (0.383) | 1.460*** | (0.049) |
| *ifPartnerOfReci* | | | — | | 0.129*** | (0.034) | — | | 0.051 | (0.044) |
| # of Obs. | 1955680 | | 230061 | | 1312467 | | 7900 | | 405252 | |
| # of Exchanges | 112218 | | 11597 | | 83528 | | 194 | | 17090 | |
| Log likelihood | -167383.54 | | -17922.165 | | -118613.93 | | -402.58 | | -29725.37 | |
| LR chi² | 92047.67 | | 13653.17 | | 67288.57 | | 247.29 | | 12297.63 | |
| Prob > chi² | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| Pseudo R² | 0.22 | | 0.28 | | 0.22 | | 0.24 | | 0.17 | |

*$p<0.05$, **$p<0.01$, ***$p<0.001$

| Table D3. Analyses of Decisions about Incoming Requests by CEM Matched Users | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Dependent Variable** | | | | | | | |
| | *ifReject* | | | | *mailSpeed* | | | |
| **Model** | **(1) Random Effects Logit** | | **(2) Fixed Effects Logit** | | **(3) Random Effects** | | **(4) Fixed Effects** | |
| **Variables** | **Coeff.** | **Std. Err.** | **Coeff.** | **Std. Err.** | **Coeff.** | **Std. Err.** | **Coeff.** | **Std. Err.** |
| *Constant* | 1.110*** | (0.429) | | | 15.629*** | (1.550) | 2.566 | (2.750) |
| *p_ifBio* | 0.089 | (0.052) | 0.091 | (0.056) | 0.010 | (0.099) | 0.012 | (0.010) |
| *p_ifPhoto* | -0.079 | (0.055) | -0.093 | (0.061) | 0.055 | (0.105) | 0.033 | (0.106) |
| *p_tenure* | -0.000 | (0.000) | -0.000 | (0.000) | -0.001 | (0.001) | -0.001 | (0.001) |
| *p_ifAvid* | 0.109 | (0.101) | 0.068 | (0.098) | -0.248 | (0.505) | -0.041 | (0.336) |
| *p_lastLogin* | -0.000 | (0.000) | -0.000 | (0.000) | 0.000 | (0.000) | 0.000 | (0.000) |
| *p_fbScoreLog* | -0.059 | (0.035) | -0.020 | (0.039) | 0.018 | (0.069) | 0.048 | (0.071) |
| *p_rejected* | 0.001 | (0.002) | 0.001 | (0.001) | -0.004 | (0.003) | -0.005 | (0.003) |
| *p_sentLost* | 0.004 | (0.004) | 0.005 | (0.005) | 0.006 | (0.009) | 0.007 | (0.009) |
| *p_receiveGiveRatio* | -0.033 | (0.060) | -0.012 | (0.066) | -0.030 | (0.116) | -0.000 | (0.117) |
| *ifReciprocal* | 0.576 | (0.752) | 0.127 | (0.705) | 0.263 | (0.722) | 0.357 | (0.651) |
| *ifFriend* | -1.045*** | (0.297) | -1.212*** | (0.336) | -1.240*** | (0.280) | -1.418*** | (0.302) |
| *ifSameCountry* | -0.243** | (0.077) | -0.415*** | (0.094) | — | | — | |
| *tasteSimilarity* | -0.329 | (0.349) | -0.323 | (0.406) | -0.108 | (0.740) | -0.357 | (0.752) |
| *sharedGenre* | 0.004 | (0.008) | 0.001 | (0.009) | -0.023 | (0.017) | -0.013 | (0.017) |
| *p_focalDepthLog* | 0.183 | (0.237) | 0.419 | (0.270) | 0.109 | (0.691) | 0.321 | (0.717) |
| *p_sharedDepthLog* | -0.148 | (0.236) | -0.415 | (0.268) | 0.013 | (0.689) | -0.177 | (0.715) |
| *ifAvid * ifReciprocal* | -1.763* | (0.782) | -1.566* | (0.723) | -1.560* | (0.712) | -1.498* | (0.703) |
| *ifAvid * tasteSimilarity* | -0.802* | (0.396) | -0.928* | (0.454) | -1.532* | (0.749) | -1.628* | (0.772) |
| *ifAvid * sharedGenre* | 0.000 | (0.009) | -0.016 | (0.011) | 0.012 | (0.019) | 0.006 | (0.019) |
| *ifAvid * p_focalDepthLog* | -0.231 | (0.251) | -0.475 | (0.290) | -0.367 | (0.711) | -0.632 | (0.738) |
| *ifAvid * p_sharedDepthLog* | 0.202 | (0.250) | -0.489 | (0.289) | 0.258 | (0.710) | 0.494 | (0.736) |
| *transToPartner* | -0.040* | (0.018) | -0.045* | (0.018) | 0.006 | (0.006) | 0.007 | (0.006) |
| *transFromPartner* | -0.016 | (0.021) | -0.011 | (0.021) | -0.142*** | (0.007) | -0.141*** | (0.007) |
| *pendingToPartner* | -0.149*** | (0.031) | -0.112*** | (0.031) | -0.285*** | (0.030) | -0.284*** | (0.030) |
| *pendingFromPartner* | -0.188* | (0.071) | -0.162* | (0.071) | -1.942*** | (0.065) | -1.951*** | (0.065) |
| *priceLog* | 0.024* | (0.012) | 0.050*** | (0.014) | -0.036 | (0.024) | -0.026 | (0.024) |
| *numChoices* | 0.000 | (0.001) | 0.000 | (0.000) | -0.001 | (0.001) | -0.001 | (0.001) |
| *ifBio* | -0.321*** | (0.088) | — | | 0.469 | (0.724) | — | |
| *ifPhoto* | -0.060 | (0.098) | — | | 0.357 | (0.526) | — | |
| *ifAvid* | -0.201 | (0.259) | --- | | -0.257 | (0.562) | --- | |
| *Tenure* | 0.016 | (0.023) | 0.012 | (0.023) | 0.010 | (0.016) | -0.054 | (0.041) |
| *fbScoreLog* | -0.098 | (0.083) | 0.032 | (0.382) | -0.484 | (0.367) | 0.529 | (0.610) |
| *Rejected* | 0.040*** | (0.003) | 0.167*** | (0.014) | 0.011 | (0.019) | -0.036 | (0.035) |
| *sentLost* | 0.007 | (0.010) | 0.018 | (0.021) | 0.026 | (0.026) | 0.015 | (0.029) |
| *numPending* | -0.001 | (0.004) | -0.005 | (0.004) | -0.011*** | (0.003) | -0.009* | (0.004) |
| *Lamda* | — | | — | | 1.993 | (1.287) | 2.346 | (1.620) |
| # of Obs. / Exchanges | 66815 | | 26715 | | 64255 | | 64255 | |
| Model Fit: | Log likelihood: -9317.3467 Wald chi²: 726.38 Prob > chi²: 0.00 | | Log likelihood: -4634.16 LR chi²: 324.64 Prob > chi²: 0.00 | | Wald chi²: 2130.19 Prob > chi²: 0.00 rho: 0.670 | | F Stat: 68.39 Prob > F: 0.00 rho: 0.717 | |
| Hausman Test | chi² =332.09 Prob > chi² = 0.00 | | | | chi² =139.32 Prob > chi² = 0.00 | | | |

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

# Appendix E

## Survey Instruments

Table E1 summarizes the operationalization of each construct used in the survey. All the Cronbach's alpha values are above the recommended threshold of 0.70, suggesting good reliability for all construct scales (Fornell and Larker 1987). One way to evaluate the convergent and discriminant validity of each construct is to examine the factor loadings of each indicator. Each indicator should have higher loadings on the construct of interest than on any other construct (Chin 1998). Table E2 shows the factors loadings and cross-loadings for all the constructs. An inspection of this table suggests that the measurement model of all constructs provides adequate discriminant and convergent validity.

| Table E1.  Construct Operationalization[a] | | Cronbach's α | Mean[b] | S.D. |
|---|---|---|---|---|
| **Altruistic Orientation (adapted from Webb et al. (2000) and Smith 2003)** | | **Cronbach's α** | **Mean[b]** | **S.D.** |
| ALT1: | People should be willing to help others who are less fortunate. | 0.773 | 3.88 | 0.66 |
| ALT2: | [+]Those in need have to learn to take care of themselves and not depend on others. | | | |
| ALT3: | Personally assisting people in trouble is very important to me. | | | |
| **Long-Term Relationship Orientation (adapted from Ganesan 1994)** | | | | |
| LRO1: | I believe that over the long run, a relationship with someone else on the website will be beneficial. | 0.737 | 3.25 | 0.62 |
| LRO2: | Maintaining a long-term relationship with someone else on the website is important to me. | | | |
| LRO3: | I focus on long-term goals in the relationship with someone else on the website. | | | |
| LRO4: | I am willing to make sacrifices to help another individual on website from time to time. | | | |
| **Disposition to Trust (adapted from Ridings et al. 2002)** | | | | |
| DOT1 | I generally have faith in humanity | 0.700 | 3.75 | 0.61 |
| DOT2 | I feel that people are generally reliable | | | |
| DOT3 | I generally trust other people unless they give me reason not to. | | | |

[+]Reverse coded item
[a]All the items are measured on a 5-point Likert scale.
[b]An individual's score on each construct is measured as the average of agreement (five-point scale) with statements for all items corresponding to the construct.

| Table E2.  Factor Loading and Cross-Loadings | | | |
|---|---|---|---|
| | **Altruistic Orientation** | **Long-Term Relationship Orientation** | **Disposition to Trust** |
| ALT1 | **0.861** | 0.109 | 0.075 |
| ALT2 | **0.797** | 0.075 | 0.017 |
| ALT3 | **0.834** | 0.221 | 0.107 |
| LRO1 | 0.224 | **0.772** | 0.265 |
| LRO2 | 0.054 | **0.862** | 0.211 |
| LRO4 | 0.087 | **0.837** | 0.141 |
| LRO4 | 0.248 | **0.640** | 0.333 |
| DOT1 | 0.098 | 0.297 | **0.829** |
| DOT2 | -0.004 | 0.190 | **0.792** |
| DOT3 | 0.089 | 0.133 | **0.746** |

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