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Why are Economists so Different? Nature, Nurture and Gender Effects in a Simple Trust Game

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Why are Economists so Different? Nature, Nurture and Gender Effects in a Simple Trust Game*

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February 2014

Abstract

We analyze the behavior of 577 economics and law students in a simple binary trust experiment in class-room . While economists are both significantly less trusting and less trustworthy than law students, this difference is largely due to heterogeneity between female law and economics students. While female law and economics students are already different in nature (during the first term of study), the gap between them also widens more drastically over the course of their study compared to their male counterparts. This finding is rather critical as the detailed composition of students is typically neglected in most experiments.

JEL-classification: A12, A22, C35, C91

Keywords: Gender Effects, Trust Game, Economists, Nature, Nurture

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1 Introduction

Economists are different from most other people. This is not so much a hypothesis anymore, but can safely be considered a received wisdom by now. Ever since ? conducted their famous experiment on the free-riding of economists, there has been a rather extensive body of literature on the forms as well as the sources of differences between economists and other individuals. The overwhelming majority of papers finds that economists do not only hold different values and views of the world (see, e.g., ????), but also report that economists are more selfish and less trustworthy than others (see, e.g., ?????). A small minority of papers has found the opposite though (see, e.g., ?). Major parts of this literature focus on the question whether economists are different by nature even before they begin their studies, the argument being that economics students self-select into the study of economics (see, e.g., ???) or whether students which study economics adopt different values or patterns of behavior over the course of their studies - the so-called nurture hypothesis (see, e.g., ???). ? provide evidence for the presence of nature effects which are strengthened through nurture. For a survey of much of the literature on the differences between economists and other people also see ?.

In another and almost completely unrelated stream of economic literature, a probably even less controversial finding has been reported and analyzed, namely that women are different and behave differently from men. The study of gender effects has been especially popular in the experimental and behavioral economics literature. As the excellent survey by ? reports an almost received wisdom is now that, if gender effects are found at all, women tend to be more careful (or risk-averse) and, therefore, less trusting than their male counterparts. At the same time, females tend to be more trustworthy (once they are trusted by others) if gender effects can be identified (see, e.g., ???). More recent surveys by ? on trust and deception games and ? on trust games only, basically support this view, even though some studies do not find any gender effects (see, e.g., ?).

Surprisingly enough, there has been, to the best of our knowledge, hardly any literature which combines these two strands of research even though some questions appear to be obvious such as: Are female economists predominantly female or predominantly economists or, put differently, do female economists behave more like typical economists (i.e., less trusting and also less trustworthy) or do they rather exhibit the behavior found to be typical for females in trust games, i.e. less trusting, but more trustworthy. Given the literature above, a second question is obviously whether and how this behavior may be affected by studying economics. Interestingly, ? have recently found that male

and female economists in the American Economic Association appear to differ rather substantially in their view on economic policy issues such as health insurance, education, and labor standards. These survey-based results already provide some evidence that male and female economists may differ.

This paper aims at shedding some light on the questions just mentioned. For this purpose we have conducted a simple binary classroom experiment with (i) law students and economics students (ii) in both introductory and more advanced classes and found the following: Firstly, female economists are less trusting than both male economists and female (and male) law students, which may suggest that being female and an economist at the same time fortifies distrust in others. In addition, the lack of trust appears to be further nurtured through the study of economics in an even stronger fashion than with male economics students. In sharp contrast, female law students become more trusting over the course of their studies. Secondly, and somewhat surprisingly, female economists are the least trustworthy group in our experiment both at the beginning of their studies and even more so when they are more advanced. We also find evidence for similar nurture effects among male economists and male law students who both become less trustworthy as their studies proceed, while we do not find these nurture effects for female law students who remain a highly trustworthy group.

The rest of this paper is now organized as follows: The experimental design will be described in detail in Section 2 before the results are reported in Section 3. Section 4 offers a summary and concludes.

2 Experimental Design

The experiment is based on a sequential prisoner's dilemma game or binary trust game following ?. The game tree representation of the game studied is included in Figure ??.

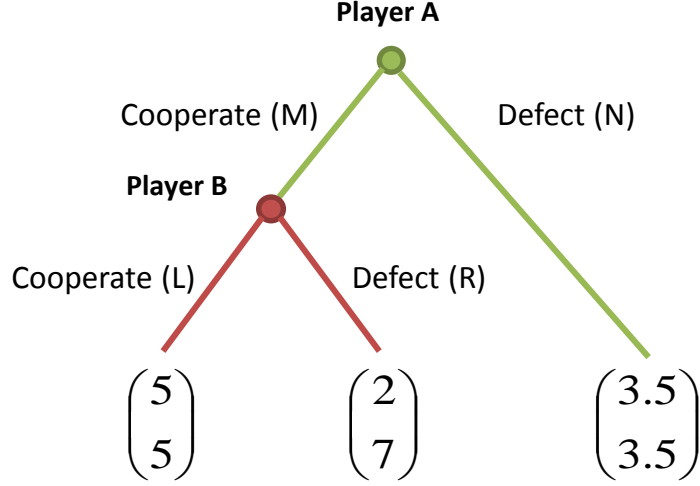


Figure 1: Game tree of the binary trust game

Two players A and B sequentially decide between the two decision possibilities *Cooperate* or *Defect*. The decision in the role of player A represents the trusting choice, for which either trust (M) or no-trust (N) can be chosen, whereas the second stage decision represents the reciprocity choice between reciprocity (L) or non-reciprocity (R). If first mover, player A, decides not to trust and therefore not to enter the game both players are assigned 3.5 EUR and the decision of player B is irrelevant for the overall payoff. In case that player A enters the game, player B's decision determines the output for both players. She can choose the trustworthy decision and both players receive 5 EUR or the non-reciprocal branch, where player A obtains 2 EUR and player B acquires the maximum possible payoff of 7 EUR.

The only subgame perfect Nash equilibrium is both players choosing the self-fish outcome, so that a payoff of 3.5 EUR each is predicted. Nevertheless, the sequential prisoner's dilemma is influenced by each player's beliefs about the behavior of the matched partner and the whole group. This is why, also strategy M (the trusting choice) can be a best response for player A. This is true if she believes that the probability of player B choosing L (the reciprocal branch) is at least 50 percent.¹ The average payoff earned over all sessions was 4.05 EUR, so higher than the subgame perfect Nash equilibrium outcome

¹Player A is indifferent between strategy M and N if

$$5p + 2(1 - p) = 3.50 \Leftrightarrow 3p = 1.5 \Leftrightarrow p^* = 0.5$$

of 3.50 EUR, meaning that people acted way more often reciprocal than the theory prediction suggests.

In order to abstract from the learning and experience problem that is encountered with repetition of the trust game, every participant decides only once and subjects are randomly matched with each other. In order to obtain more observations both subjects decide as well as A and B player using the so called strategy method, but only the decision in one role determines the payoff earned for each subject.² The experiment is set up in class room in a paper based fashion. This is done, because it is the main goal of the paper to analyze student's behavior of different study majors and their interaction with each other in a natural environment where they usually also interact. Furthermore the pool of observations is much broader and the average payoff of the students is lower. As we use regression estimation techniques a big pool of subjects is crucial in order to render plausible and defensible results.

The experiment consists of three parts: First, every subject is given instructions with control questions, so that it can be ensured, that all participants understand the game. Second, the experimenter distributes and collects the decision sheet with the two decisions as A and B player and a post-experimental questionnaire in order to obtain individual characteristics like gender, age, study information and risk attitude.³ Third, the experimenter analyzes the data while the subjects attend the lecture and comes back after the end of class to pay the students according to their performance.

All experiments were carried out at the University of Düsseldorf. The lectures studied were chosen according to study major, age of the students and the percentage female and male being equally distributed. In order to compare the behavior of economic students to others, law students were chosen as the control group, as natural sciences exhibit a male quota of almost 80 percent and other social sciences the other extreme.⁴ The experiments were conducted between summer term 2012 for the older undergraduate students in three sessions and in the first lecture of the winter term 2012/2013 to check in another three lectures whether there are further differences between freshman students

²? show in their comparison of the strategy and direct response method that 25 out of 29 surveyed studies find no significant difference between the two methods. We therefore use the strategy method in order to retrieve more observations and to enhance the thorough understanding of the game as a whole, as we force the students to decide in both roles.

³The instructions, control questions, and the post-experimental questionnaire are available from the authors upon request.

⁴The composition of the study pool at the university of Düsseldorf can be reread at the following homepage <http://www.uni-duesseldorf.de/home/universitaet/weiterfuehrend/statistiken-zahlen-und-fakten/die-universitaet-in-zahlen/studierendenstatistik.html>.

and undergraduates. An overview of all sessions is presented in Table ?? in the appendix.

The six experimental sessions result in an overall sample size of 577 subjects. All of them decided in the role of player A and player B. In the overall dataset 51 percent of the students are female and 52 percent economists, therefore there is an almost equal split between these two groups. The subjects are on average in the second semester and 21 years old. 67 percent of all subjects in our experiment are students in their first semester. The share of students that have a minor in economics or already changed study is negligibly small, one and nine percent.⁵

3 Results

The next section presents the results of the trust game experiment using descriptive as well as regression techniques. Both decisions are studied separately in the two sub sections that follow. In order to disentangle the influential drivers of the trust and trustworthy decision we estimate a seemingly unrelated bivariate probit model⁶ with standard errors clustered at the class level, where i represents the corresponding student studied. :

$$\begin{aligned} decision_i = & \beta_1 ju_econ_ma_i + \beta_2 ju_econ_fe_i + \beta_3 fresh_econ_ma_i \\ & + \beta_4 fresh_econ_fe_i + \beta_5 fresh_law_ma_i + \beta_6 fresh_law_fe_i \\ & + \beta_7 ju_law_fe_i + \sum_{k=8}^K \beta_k controls_i + u_i \end{aligned}$$

Each decision is considered separately in one regression (A decision and B decision) and the variables of interest gender, time of study and major are interacted with each other. Junior law males (ju_law_ma) serve as the reference category and the coefficients displayed are average marginal effects, so that they can be interpreted as percentage influences. Further, we include control variables about the student's age (age), if they had a minor in economics at any point during their study ($minor_econ$), their risk attitude ($risk$), if they had a course with economic contents in high school ($econ_school$), if they changed major during their study ($study_change$) and if the class exceeds the number of 50 students ($sizemore50$). The question about the subjects' beliefs about the

⁵The interested reader is referred to ?? in the appendix for further details

⁶We use this method as both decisions are binary choices, but made by the same student, so that we avoid correlation of the error problems using a bivariate probit model. The test that a bivariate model is really necessary is given in the last row of Table ?? by the fact that the null hypothesis of $\rho = 0$ can be rejected at the one percent significance level.

overall non-reciprocity level in the class (*beliefs*) is included for the trusting decision only. Corresponding results are summarized in Table ??.

3.1 Trust decision results

Descriptive results for the whole sample according to examined subgroups are presented in Figure ?? for the trusting decision. It can be stated that stable gender and study major effects are found. Economic students and females trust significantly less with about 40 percent. The result is significant on the one percent significance level for the study effect and on the 5 percent significance level for gender differences⁷. Our findings are in line with the literature on trust games in combination with gender issues⁸ and almost replicate the trust results in ?, who find in their study, that 43 percent of the economists trust. In the overall sample freshman and junior students do not statistically differ in trusting levels.

In a next step, we split the sample further. The bars of the histogram in Figure ?? represent the percentage shares of the trusting possibility chosen by the eight time of study, major and gender subgroups. The most striking result is that female economists are the least trusting category, e.g. only 39 percent of the freshman females trust. This value decreases to 23 percent if the females study economics on the undergraduate level. Economic male students trust more than their female counterparts. Nevertheless learning seems to play a role here as well, as the trusting share decreases from 53 percent to 44 percent with more study experience. The pattern among law students is not as clear cut. Junior law females are, by far, the most trusting group with 80 percent choosing the trusting outcome. Contrasting only 47 percent of the first semester female law students say they would trust. Among male law students the trusting difference is only 6 percentage points and more experienced students trust more.

⁷We use the Chi Square test to test the difference between the categorical variables gender, major and study level. The necessary assumption of having five observations for each category is easily fulfilled. The smallest category under investigation is 18.

⁸See ?, Table 3 for an extensive overview of experiments in trust games.

Table 1: Bivariate Probit regression of trust and trustworthy decision

	A decision	B decision
junior_econ_male	- 0.103** (0.041)	- 0.112*** (0.013)
junior_econ_female	- 0.267*** (0.03)	- 0.250*** (0.043)
freshmen_econ_male	- 0.014 (0.018)	0.083*** (0.008)
freshmen_econ_female	- 0.110*** (0.03)	- 0.149*** (0.024)
freshmen_law_female	- 0.047*** (0.004)	0.000 (0.005)
junior_law_female	0.153** (0.066)	0.013 (0.067)
freshmen_law_male	- 0.015 (0.07)	0.116*** (0.035)
age	0.015*** (0.004)	0.005 (0.003)
minor_econ	0.069 (0.043)	- 0.298** (0.133)
risk	0.001 (0.001)	0.000 (0.001)
econ_school	- 0.033 (0.029)	- 0.063 (0.042)
study_change	- 0.068 (0.071)	0.043 (0.057)
sizemore50	- 0.030** (0.013)	- 0.014 (0.03)
beliefs	- 0.005*** (0.001)	- -
No of obs	549	549
Wald test of $\rho = 0$	$\chi^2 = 8.54$	Prob> $\chi^2 = 0.0035$

Note: Seemingly unrelated bivariate probit regression with clustered standard errors; average marginal effects displayed; reference category for interactions: freshmen_law_male; A-decision=1 is the trusting possibility and B-decision=1 is the reciprocal choice; Standard errors in parentheses; *** significant at 1 percent level ** significant at 5 percent level * significant at 10 percent level.

Confirming descriptive analysis, undergraduate female economists are the least trusting subgroup also if regression analysis is used. They trust 26 percent less than freshman male law students and this effect is highly significant on the 1 percent level. The bi-variate probit regression also confirms that among female and male economists an indoctrination effect towards less trust the longer one studies economics is present. Furthermore, the regression results for the trusting decision show that the difference between freshmen law males, the reference category, and their junior counterparts is statistically insignificant. The same holds for male freshmen economists. Junior law females trust 15.3 percent more than the reference category and therefore, are the most trusting subgroup in the sample. Senior male economists and freshman female economists trust both around 10 percent less than the reference category. Among the control variables especially a larger group and the beliefs that more fellow students will choose the non-reciprocal branch decreases the overall trust level. This effects are nevertheless not very strong in magnitude. Furthermore the older the subjects the higher the trust percentage. All other control variables show statistically insignificant coefficients.

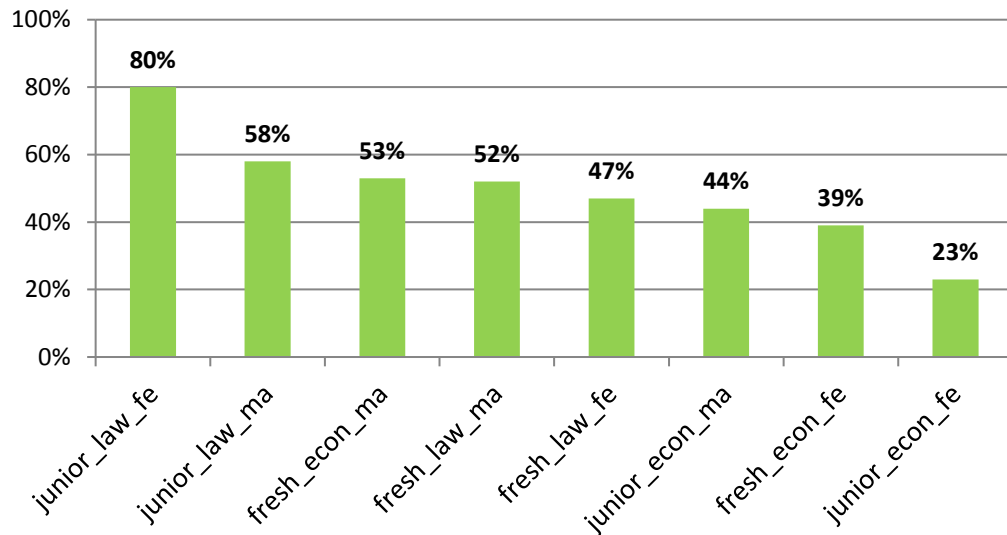


Figure 2: Share of trust actions by gender, major and time of study
Explanation: fe=female, ma=male, econ=economist, fresh=freshman

3.2 Reciprocity decision results

Figure ?? represents the reciprocity decision results for the whole sample. On the second stage of the game 49 percent of the males but only 41 percent of the females act reciprocally. This difference is also statistically different from zero at the five percent significance level. The corresponding χ^2 -test renders a p-value of 0.047. This result is surprising and contradicting the literature on trust games and gender, summarized in ?, that finds women to be more reciprocal than men. Around 40 percent of the economists reciprocate whereas 51 percent of the law students choose the reciprocal action. The null hypothesis of no correlation is rejected at the one percent significance level. This effect is similar to the result found by ?, but on a lower level. The third dimension studied, the time of study effect shows differences for the full sample. Freshman students are more reciprocal than juniors. This result is statistically significant on the five percent level.

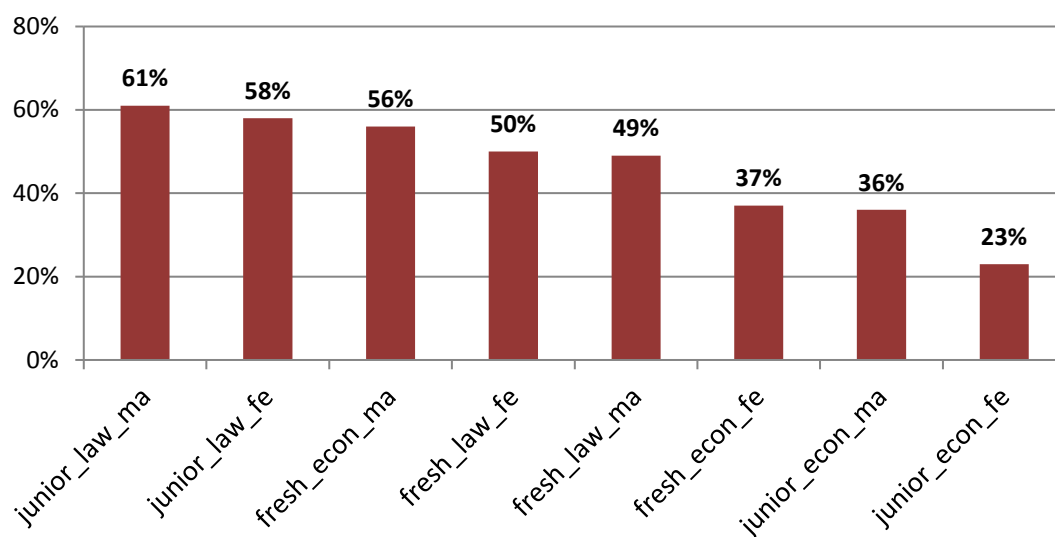


Figure 3: Share of reciprocity actions by gender, major and time of study
Explanation: fe=female, ma=male, econ=economist, fresh=freshman

The analysis of the second stage decision, divided in subgroups, shows similarities as well as differences in comparison to the trusting choice. The results are presented in Figure ?. As well as on the first stage, older female economists are the least reciprocal group. Again, only 23 percent decide to reciprocate and the younger counterparts show a reciprocity share of 37 per-

cent. The economic males also show a similar behavior between freshman and junior students. Only 36 percent of the undergraduates, but 56 percent of the first semester students choose the less selfish outcome. Similar to the trust game results, the economists, no matter if female or male, become less reciprocal while studying. This effect is reversed if law students are analyzed. They become even more reciprocal while attending law courses. The gender pattern among law students is also contrary to the one observed for economists. Law males in general seem to be more reciprocal than females.

With regard to regression analysis, the descriptive results of Figure ?? are confirmed. Among economists, female students are the main driving force behind the lower reciprocity levels compared to law students. The undergraduate group reciprocates 25 percent less and the freshman females 15 percent less than freshman law males. Both results are statistically significant on the one percent significance level. The behavior of the male economists is more diverse. On the one hand, junior economists reciprocate 11 percent less often than their law counterparts, on the other hand freshman economists reciprocate 8 percent more often. Again both coefficients are highly significant. These results also confirm the indoctrination hypothesis for economists, both females and males. With regard to law students junior law males are confirmed as the most reciprocal student group. They reciprocate 11.6 percent more often than their freshman counterparts. Freshman law females, however, show the same reciprocity behavior than the reference category. In contrast to the descriptive results, the coefficient for junior law females is insignificant. The only decision relevant control variable is the one indicating students that have a minor in economics. This leads to a further reduction of the overall reciprocity level of further 29 percent and is highly statistically significant.

4 Conclusion

This paper has analyzed the behavior of 577 economics and law students in a simple binary class-room trust experiment. While economists are both significantly less trusting and trustworthy than law students, this difference is largely due to differences between female law and economics students. While female law and economics students are already different in nature (during the first term of their respective studies), the gap between them also widens more drastically over the course of their study compared to their male counterparts. This finding is rather critical as the detailed composition of students is typically neglected in most experiments reported in the economics literature.

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A Appendix

Table A.1: Overview over all Sessions

	Course	Major	Students	Term
Session 1	Economic Policy	Economics	85	Summer 2012
Session 2	Economic Policy	Economics	36	Summer 2012
Session 3	Municipal Law	Law	48	Summer 2012
Session 4	German Civil Code	Law	231	Winter 12/13
Session 5	Microeconomics	Economics	99	Winter 12/13
Session 6	Microeconomics	Economics	79	Winter 12/13

Table A.2: Summary statistics

Variable	Description	Obs	Mean	Std. Dev.	Min	Max
a_decision	Dummy (1=M)	577	0.47	0.50	0	1
b_decision	Dummy (1=L)	577	0.45	0.50	0	1
economist	Dummy	577	0.52	0.50	0	1
law	Dummy	577	0.48	0.50	0	1
gender	Dummy (1=female)	577	0.51	0.50	0	1
age	Absolute	573	21.30	2.84	16	44
no_semester	Absolute	575	2.11	1.80	1	9
freshman	Dummy	577	0.67	0.47	0	1
minor_econ_yn	Dummy	556	0.01	0.10	0	1
study_change_yn	Dummy	575	0.09	0.29	0	1
risk	Absolute amount	575	36.49	31.80	0	100
sizemore50	Dummy	577	0.71	0.46	0	1
beliefs about R	Percentage	574	68.91	24.66	5	100
payoff	EUR	577	4.05	1.44	2	7

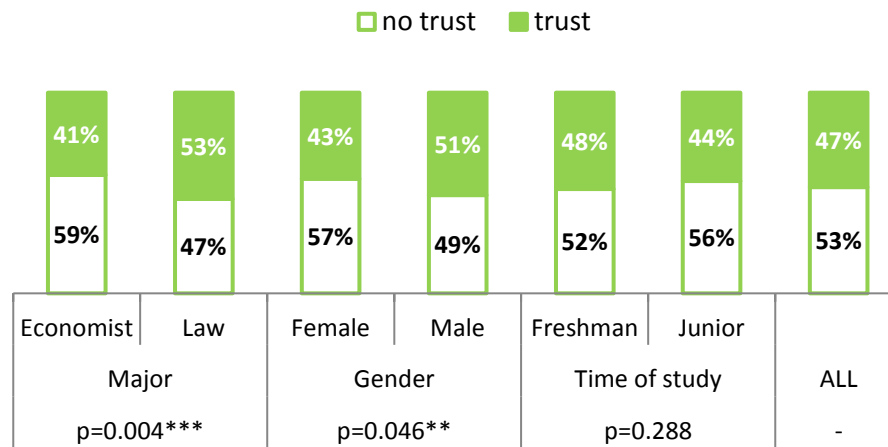


Figure A.1: A decision results by gender, major and time of study

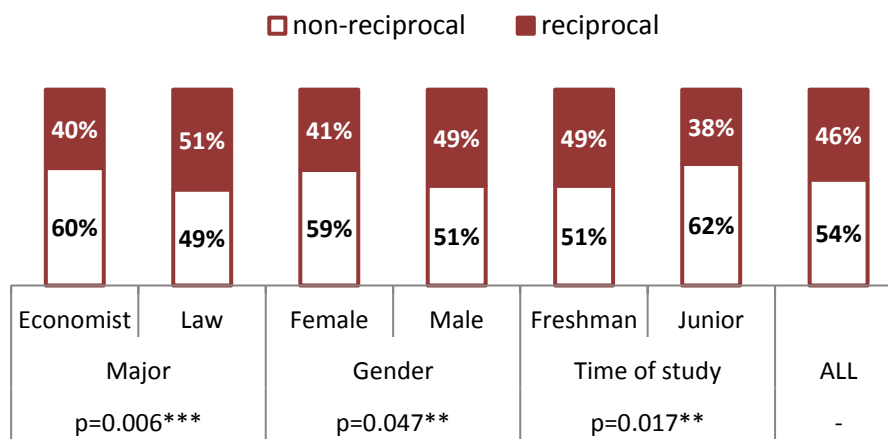


Figure A.2: B decision results by gender, major and time of study