Stockholm School of Economics
Department of Economics
Bachelor's Thesis
Spring 2011

The Effect of an Education in Business and Economics on the Behaviour in a Moral Hazard Situation

Abstract

Market failures being highlighted during the most recent financial crisis, aroused our interest of moral hazard. We study behaviour in a moral hazard situation on an individual level. More precisely, we investigate the effect of an economics and business education at the Stockholm School of Economics (SSE) on moral hazard behaviour (Indoctrination effect). Additionally, it is investigated if the people who choose to study at SSE have an inclination to act in a certain way (Selection effect), and if this combined with the education have an impact on behaviour in a moral hazard situation. This is primarily researched using three linear regressions estimated with the Ordinary Least Squares method. The findings conclude that third-year students at SSE are more risk willing with their own money compared to first-year students and non-business students. Additionally third-years are less prone to moral hazard than first-year students. This suggests that the indoctrination effect increases students' risk willingness, however at the same time decrease the risk taking in a moral hazard situation. There is no selection effect, and the indoctrination effect and selection effect in combination do not imply changed behaviour in a moral hazard situation either. However, first-year students tend to risk more in a moral hazard situation. Future research on behaviour in a moral hazard situation on an organizational level is suggested, to fully understand implications of our findings.

Key Words: Moral Hazard, Indoctrination, Selection, Risk willingness

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Acknowledgements

We would first like to thank Erik Lindqvist for being an excellent tutor and providing support and valuable suggestions. Furthermore, we would like to thank Tore Ellingsen and Fredrik Törn for useful advice concerning our survey. Additionally, suggestions and patience from friends and family have been truly appreciated.

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1. Introduction

"…any situation in which one person makes the decision about how much risk to take, while someone else bears the cost if things go badly."

Definition of Moral Hazard, Paul Krugman (2009, s. 63)

Market failures are pertinent in the banking industry. One reason for market failure occurring is the fact that banks have a safety net. Practically every country has a government protection for large banks, at least to some degree. During the financial crisis, government protection became apparent in the form of G7 and G20 communiqués. G7 finance ministers and central bank governors stated that they agreed to "take decisive action and use all available tools to support systemically important financial institutions and prevent their failure". With this, the governments sent the message that large banks were "too big to fail" (Hildebrand 2008).

It is generally known that the existence of insurance tends to result in less careful behaviour, i.e. moral hazard. Hildebrand (2008) uses an example with an insured rental car as an illustration. If you rent a fully insured car you are likely to drive with less care. Thus, rental cars have a shorter life span than non-rentals. It is similar with banks. A banker has less incentive to avoid insolvency than if he is not insured. This can additionally be seen in banks' balance sheets. Banks tend to hold a low level of capital and have a preference for high leverage.

In the light of the actualization of the problem of moral hazard during the financial crisis, we found it interesting to study how individuals respond to a moral hazard situation. More explicit, how a business and economics education might affect risk willingness and response to a moral hazard situation. This type of education was chosen since it can be assumed that people working within the financial industry might have been educated in those subjects. More specifically, a business and economics education at the Stockholm School of Economics have been investigated. The three industries that recruited the most SSE students 2009 were Investment Banking (16%), Finance/Banking (14%) and Management Consulting (11%) (SSE Placement Report 2010).

Although our interest for moral hazard was aroused by the financial crisis and the banking industry, we have to be cautious about making conclusions about the external validity of the study (Mitchell and Jolley 2001, Brewer 2000).

2. Purpose

As mentioned in the introduction, financial institutions' behaviour in moral hazard situations has been discussed considerably during the most recent financial crisis. Explicitly, the existence of a safety net in form of government intervention has been seen as a cause for more risk taking among banks. This type of behaviour also exists on an individual level (Hildebrand 2008). Higher risk taking in banks could further be due to higher risk willingness among people working in the banking industry.

Since it can be assumed that people working in financial institutions have a business and economics education (hereafter referred to as a business education), we found it interesting to investigate how a business education, more precisely an education at the Stockholm School of Economics (hereafter referred to as SSE) affect students' behaviour in a moral hazard situation. Additionally, we investigated if a certain type of person chooses to study at SSE with regard to the same type of behaviour. The combined effect of a business education and a certain type choosing to study at SSE was also investigated. To fully explore the effect of a moral hazard situation, we further looked at the risk willingness of the individuals.

3. Moral Hazard

The term moral hazard was first founded in the insurance industry. For example, fire insurance companies early observed that people who had a fully covering insurance against loss tended to have destructive fires. Today, the term can be said to refer to any type of situation where one person decides how much risk to take, while someone else must pay the costs if things go wrong (Krugman 2009).

A moral hazard is when one party has the responsibility for another, but at the same time has the incentive to favour his or her own interest (Dowd 2009). What causes the problem to arise is information asymmetry between the parties involved. That is, when one party has more accurate information than the other and tends to behave inappropriately with regard to the other. It should also be noted that moral hazard is the risk of hidden actions and therefore distinct from adverse selection, which arises from hidden information (Mishkin 1999).

Moral hazard can be observed within other areas except for the insurance industry, such as for example in labour contracting and in delegation of responsibility concerning decision-making (Holmstrom 1979). A field where moral hazard has been highly recognized is in the financial sector (Dowd 2009). One example is when a borrower takes out a loan. Usually, the borrower has more precise information than the lender about the returns and risks associated with a planned investment. The borrower might have incentives to invest in a project with a high risk, where the borrower is well off if the project is successful, but the lender pays the cost if things go wrong. Thus, the lender will always be subject to the hazard that his or her incentives do not align with those of the borrower (Mishkin 1999).

The term moral hazard is often associated with increased risk taking, since people tend to take higher risks if someone else pays the cost if things go wrong. Under circumstances with insufficient control, moral hazard is therefore often the cause of excessive risk taking, something that was well observed during the most recent financial crisis (Dowd 2009).

4. Previous Research

To our knowledge, there are no previous studies specifically on the behaviour in a moral hazard situation of economics and business students. However, how people act in moral hazard dilemmas can be influenced by several elements. Perspective on risk, moral attitude and self-interest might all determine how a person acts in such a situation. Previous studies on business and economics students can be found within mentioned three areas, and each could have implications for the results found in this thesis.

4.1 Risk behaviour

Risk behaviour is an important aspect of moral hazard. Lack of knowledge about risk management and insurance in the business world is common and Hamilton et al. (2003) stated that there is a need to increase the awareness of the subject.

In a study by Sjöberg and Engelberg (2009), business students, and especially finance students, showed an inclination towards taking higher risks. Undergraduate students of financial and behavioural economics from Uppsala and Stockholm universities as well as students of financial psychology at SSE were compared with a group of nonstudents and a random sample of the Swedish population. The results showed that the finance students had a tendency to take higher risks and gamble more, they were sensation seekers, showed little concern for money and did not prioritize altruistic values. Tang et al. (2008) further

investigated possible differences between business and psychology students in unethical behaviour. It was found that love for money, Machiavellianism and risk tolerance indicated unethical behaviour for business students and a general sample, however not for the psychology students.

Further, gender differences in decision making under risk have been studied among business students. The results indicated that men had higher risk tolerance than women and that a higher efficiency in task completion was associated with a higher individual acceptance for risks. It was further found that men's risk tolerance was associated with a group's risk tolerance (Karakowsky and Elangovan 2001). Frankfurter et al. (2001) also found gender differences among how business students' experienced risky situations. High uncertainty among the respondents regarding possible consequences of a situation led to higher risk taking. It was moreover concluded that age, social status and other similar factors might affect perceptions of risk-taking.

Kahneman and Tversky (1979) developed a model to explain decision-making under risk, the Prospect theory. Explicitly, outcomes that are probable are underweighted relative to outcomes that are obtained with certainty, and value is associated with gains and losses instead of the final outcome. Probabilities are in general underweighted, however low probabilities are instead overestimated. Bergkvist et al. (1994) describe an experiment on first-year business students. It was shown, in line with the prospect theory, that more students thought they had a higher probability of succeeding in a game where they risked losing something than in the game were they had the possibility of winning something. Also according to the prospect theory, students overestimated the value of low probabilities and high probabilities were underestimated.

Kallmen (2000) further tested whether risk perception is dependent on personality on business students. The study indicated that individuals with low anxiety, internal control and high self-efficacy experienced general risks as well as personal risks to be higher than people who were shown to have high anxiety, low self-efficacy and external locus of control.

4.2 Moral attitudes

During the 20th century, several people educated at famous business institutions have been discovered to be participating in illegal financial activities. Thus, the ethical considerations at

business schools have been questioned. Economic theory has also been accused for encouraging unethical behaviour (Bergkvist et al. 1994).

Bergkvist et al. (1994) made two surveys where the first survey was distributed to financial analysts and financial journalists as well as students at SSE who had specialized within accounting or finance. The second study included chairmen at companies that were listed on the Stockholm Stock exchange. The results showed that business students did not judge unmoral actions as harshly as people who worked within the financial sector. An explanation for this, suggested by the authors, could be the normative social behaviour within the Swedish financial sector.

Business educations make up a target for criticism with regard to the moral attitudes among business students. It has been argued that this type of education lacks a moral development of future managers and that this, as well as the amoral "profits-first" theories presented, is the cause of ethical scandals (Neubaum et al. 2005). Critics of business educations, such as Ghoshal (2005) and Mitroff (2004), are saying that the amoral theoretical framework taught in business schools, as for example agency theory and transaction-cost economics, has a negative influence on students' moral philosophies and attitudes towards profit and sustainability. If the critics are right, then there should be differences in the personal moral philosophies between students who have, and those who have not, attended a business school (Neubaum et al. 2005). Another view, suggested by Pfeffer (2005) is that the moral philosophies of business school students might instead be a cause of self-selection.

In contrast to the critics, when testing empirically with a survey, Neubaum et al. (2005) found that the personal moral philosophies of business and non-business students did not differ on a significant level, neither did the moral attitudes between business freshmen and business seniors. Hence, no results were found supporting the critic that a business education would have a negative effect on students' personal moral philosophies. However, there was a significant difference between business freshmen and business seniors regarding their attitudes towards profit and sustainability. The seniors were more likely to agree that other things than just economic dimensions, such as environmental and social aspects were important for the businesses' performance.

4.3 Selfish- and non-cooperative behaviour

There is a lot of research indicating that economists act in more selfish and less cooperative ways compared to non-economists, at least in laboratory settings. Marwell and Ames (1981) were one of the first to illuminate this topic (Laband and Beil 1999), and found that economics students were much more likely to free ride than others. Carter and Irons (1991) also found evidence suggesting that economics students behaved differently in accordance with the rational and self-interested model of economics compared to non-economics students. Further, Frank et al. (1993) made an experiment with a Prisoner's dilemma game and found that the defection rate of economics majors was significantly higher compared to non-majors. This left additional support to the assumption that economists were more willing to act self-interestingly compared to others. However, as a response to these results, Yezer et al. (1996) found evidence suggesting that the real-life behaviour of undergraduate students of economics did not correspond to how they behaved in specialized games or surveys. In real life, economics students actually behaved more cooperative compared to students in other subjects.

It has been questioned if the difference in behaviour between economics students and others is an effect of the education itself, indoctrination, or a result of self-selection into economics. Carter and Irons (1991) found that the differences they observed between economics students and others existed already when the students started their training in economics. No results were found suggesting that the difference was widened over time. Frank et al. (1993) observed that noneconomic students became more cooperative the longer they had studied. Interestingly though, this tendency was absent among economics students, suggesting that training in economics made the economics students behave less cooperatively. In the same paper, it was also tested whether the students became less honest during their time of study. The findings indicated that training in economics made the students act in more self-interested ways.

Kahneman et al. (1986) compared psychology students with business students and found that the business students tended to act in a more self-interested manner. Meier and Frey (2004) studied business students' ethical behaviour in terms of donations to charities and found support for the assumption that it was a specific type of person that chose to study business rather than the education affecting the ethical development of the individual. The will to act pro-socially was lower for economists than non-economists and business studies seemed to

attract people who showed less pro-social behaviour. However, the education did not strengthen this behaviour. Cox (1998) used a survey and found that in some situations business and economics students behaved less cooperatively than nursing and education students. As an alternative to previous research, it was also observed that the rate of cooperation actually increased among the business and economics students during their time of study.

4.4 Summation of previous research

Previous studies on risk behaviour among business students show that there are numerous elements that can influence the attitude towards risk-taking. Further, studies have shown that business and economics students tend to behave more self-interestingly and less cooperatively compared to others. It has been questioned whether this is a cause of self-selection or indoctrination. Economic theory taught at business schools has also been accused for encouraging unethical behaviour. However, empirical evidence indicates that a business education does not have a negative impact on students' personal moral philosophies.

5. Delimitations and hypotheses

We chose to delimit our study to first-year and third-year students at the Bachelor of Science Program in Business and Economics at SSE. The students will hereafter be referred to as first-years and third-years. These were all randomly chosen. Also, we questioned a group outside SSE, which we judged to be representative to use as a control group. This group is hereafter referred to as non-business students. The respondents within this group were also randomly approached.

In the thesis, the following hypotheses are examined:

Hypothesis 1*: Third-years are more prone to moral hazard than first-years. (Indoctrination effect)*

Hypothesis 2*: First-years are more prone to moral hazard than non-business students. (Selection effect)*

Hypothesis 3*: Third-years are more prone to moral hazard than non-business. (Combined indoctrination and selection effect)*

6. Method

In order to investigate our hypotheses we conducted a quantitative study. A survey study was carried out, and the three different groups of people were questioned; first-years, third-years, and non-business students. The surveys were distributed differently for the groups. For first-years, the responses were collected through announcements after lectures and the third-years received the surveys by email. The non-business students were questioned by email and responses were also collected at the central station in Stockholm.

The surveys were designed to test how much the respondents would be willing to invest in two different projects. Two variations of the survey were used to test if the respondents invested more or less of someone else's money compared to their own in a risky project. The two surveys were divided within each of the three groups and thus, no respondent made investment decisions both with their own money and someone else's. The reason for this was to make sure that the responses would not be biased, since a comparison between the two scenarios given in the surveys could influence the respondents and thereby their responses. Hence, all respondents within the same group received the same first-page in their survey. The second page differed if they were to invest their own money or someone else's (see *Appendix A*).

In the survey, questions about age and gender were included since these were regarded to be relevant control variables. Furthermore, a control question on how many ECTS Credits each student had taken at SSE was asked first-years and third-years, and a question whether the respondent had studied business/economics was included to the non-business students. The reason for this was to make sure that each person was representative for the group in which he/she was included. The first-years also answered a question about which specializations they planned to choose in their third year, and the third-years which two they had chosen. Additionally, questions concerning the importance of a high income and how many hours per week the respondent would be willing to work after finished studies were asked to respondents in all groups. The purpose of these questions, and also the questions about specializations, was to confuse the respondents about what was investigated through the survey. However, the answers were not used to draw any conclusions. The last question in both surveys asked which project (1 or 2) the respondents would choose if they had to invest the entire million in one of the projects. The answers from this question were not used either.

In survey 1 the respondents were asked how they would distribute one million SEK of their own money between two projects, Project 1 and Project 2. In Project 1 there was a 75% probability of losing the whole invested amount, meanwhile there was a 25% chance that the invested amount would be multiplied by 8. In Project 2, the risk of losing the invested amount was contrary 25%, while the chance that the invested amount would be multiplied by 2 was 75%.

In survey 2 the respondents were asked how they would distribute one million SEK of someone else's money between two projects, Project 1 and Project 2. In Project 1 there was a 75% probability of losing the whole invested amount, meanwhile there was a 25% chance that the invested amount would be multiplied by 8. If the money was lost, then the other person would bear all the cost, but if the money was multiplied, the respondent would get 40% of the multiplied amount. In Project 2, the risk of losing the invested amount was contrary 25%, while the chance that the amount would be multiplied by 2 was 75%. If the money was lost, the other person would bear all the cost, but if the money was multiplied, the respondent would get 40% of the multiplied amount.

It was vital that the design of the surveys reflected a moral hazard situation. The essential difference between the two surveys was that when the respondent invested his/her own money he/she also bore the risk if the investment turned out to be non-profitable. Contrary, when the respondent invested someone else's money, he/she did not bear the consequences of failure (i.e. moral hazard). Explicit, the respondent only risked losing money when he/she invested his/her own money. The reason why we wanted to look at the investment decisions of both one's own money and someone else's money was to be able to separate initial risk willingness from risk-taking in a moral hazard situation. Since the respondents were asked to divide the million between Project 1 and Project 2, it was sufficient to only look at the investment in Project 1 to draw conclusion about the respondents' behaviour in a moral hazard situation. Project 1 is hereafter referred to as the risky project.

7. Descriptive characteristics

In Table 1 below, descriptive characteristics for each of the three compared groups are presented. The table is further divided into each subgroup depending on which type of survey the respondents answered (see *Appendix B*). When we hereafter refer to the subgroups we

mean: first-years investing their own money, first-years investing someone else's money, third-years investing their own money, third-years investing someone else's money, non-business students investing their own money, non-business students investing someone else's money. In the following, someone else's money in the text will correspond to the denomination 'other's' in the regressions, tables and appendices.

Table 1. Descriptive characteristics of respondents

Group / Characteristic	First-years (Own money)	First-years (Other's money)	Third-years (Own money)	Third-years (Other's money)	Non-business students (Own money)	Non-business students Other's money)
Total number of respondents	40	43	46	37	46	41
Male	22	23	28	15	10	12
Female	18	20	18	22	36	29
Average age (years)	20.7	20.5	22.8	23.5	20.8	22.6
Average ECTS Credits at SSE	42.4	41.3	153.1	147.7	-	-
Average rating importance of Income (scale: 1-10)	7.6	7.6	7.6	7	6.8	6.7
Average rating work hours (hours per week)	56.3	58.9	63.1	58.8	45.4	45.4
Average investment risky project (scale: 0-10)	3.3	4.3	4.3	3.7	3.2	3.4

The descriptive characteristics for each group showed some clear differences between the three groups. First-years were on average younger than non-business students and third-years. The respondents within the group of non-business students were chosen to be in approximately the same age as the SSE students. This was in order to be able to make accurate comparisons between the groups. All respondents in the non-business student group responded no to the question if they studied business or economics. Worth to mention is also that there were considerably more women than men in this group. The third-years had taken approximately 100 more ECTS Credits than the first-years.

Within each subgroup we also looked at the distribution of the respondents to see more clearly how the groups differed with regard to their investments in the risky project (see *Appendix C*). The histograms in *Appendix C* clearly show that the groups differed in their investment decisions. The histograms also showed that there could potentially be outliers in some of the distributions. The two subgroups that looked like they had outliers were first-years investing their own money and non-business students investing their own money. To explore this further, we made calculations to find outliers in the subgroups. An outlier was defined as a value with three standard deviations distance from the mean value (see *Appendix B*). The reason why we did this was to be able to control for outliers that might have an impact on the results. Two outliers were found; one with the value of 10 in the group with first-years investing their own money, and one with the value of 10 in the group with non-business students investing their own money.

8. Statistical methods

8.1 Regressions

To test the three hypotheses, three linear regressions were estimated using the Ordinary Least Squares method, hereafter referred to as OLS. OLS is a method used to estimate parameters of a multiple linear regression model. The estimates are attained through minimizing the squared sum of residuals. OLS is the best unbiased linear estimator under the Gauss-Markov assumptions. In addition, OLS is relatively easy to interpret (Wooldridge 2009). We used parametric as well as non-parametric tests to derive the differences in investment behaviour between the groups. Specifically, Mann Whitney U-tests were carried out complementary to the three main OLS regressions. We included non-parametric tests to increase the robustness of the results. However, all groups compared include more than thirty respondents and thus a normal distribution could be assumed (Newbold et al. 2007).

Three different databases were used in our main regressions; one including the observations of first-years and third-years, one including the observations of first-years and non-business students, and one including the observations of third-years and non-business students.

The following main regressions were estimated:

Regression (1)

$$\textit{Investment in risky project}_i = \beta_0 + \beta_1 \textit{Third-year}_i + \beta_2 \textit{Other's}_i + \beta_3 \textit{Third-year}_i \times \textit{Other's}_i + \varepsilon_i$$

Regression (2)

$$\textit{Investment in risky project}_i = \beta_0 + \beta_1 \textit{First-year}_i + \beta_2 \textit{Other's}_i + \beta_3 \textit{First-year}_i \times \textit{Other's}_i + \varepsilon_i$$

Regression (3)

$$\textit{Investment in risky project}_i = \beta_0 + \beta_1 \textit{Third-year}_i + \beta_2 \textit{Other's}_i + \beta_3 \textit{Third-year}_i \times \textit{Other's}_i + \varepsilon_i$$

To obtain the significance of the differences between the subgroups that were not given from regressions (1) – (3), we also estimated OLS regressions with dummy variables representing each subgroup. This was to be able to test the risk willingness within and between all the different subgroups.

Additionally, we tested for heteroscedasticity in the three OLS regressions. The Breusch-Pagan test was used. The Breusch-Pagan test showed heteroscedasticity in two out of the three regressions (see *Appendix D*). As a consequence, the OLS regressions were carried out with robust estimates of the standard errors (Wooldridge, 2009). The correlation between the independent variables in the three regressions was not strong and multicollinearity could therefore be ruled out (see *Appendix E*).

We further controlled for age and gender in all OLS regressions. This was done since we wanted to isolate the effect of a business education on moral hazard behaviour. Previous studies have also found that both age and gender can affect perception of risk (Karakowsky and Elangovan 2001, Frankfurter et al. 2001).

Additionally, as mentioned under Descriptive Characteristics, the respondents' investments in the risky project for all groups were graphed in histograms (see *Appendix C*). According to

these figures and from calculations we concluded that there were two outliers that could possibly affect the results. Therefore, the regressions were estimated both with and without outliers and the results compared.

8.2 Definition of the variables in each regression

The variables in the regression (1) – (3) above can be interpreted according to Table 2 below:

Table 2. Description of variables

Variable	Description
Investment in risky project (Dependent variable)	Measures the amount invested in the risky project. Takes a value of 0-10.
Third-year$_i$	Dummy variable that takes the value of 1 if the respondent is a third-year, and 0 otherwise.
First-year$_i$	Dummy variable that takes the value of 1 if the respondent is a first-year, and 0 otherwise.
Other's$_i$	Dummy variable that takes the value of 1 if the respondent invests someone else's money, and 0 otherwise.
Third-year$_i$ × Other's$_i$	The interaction effect. Dummy variable that takes the value of 1 if the respondent is a third-year and invests someone else's money, and 0 otherwise.
First-year$_i$ × Other's$_i$	The interaction effect. Dummy variable that takes the value of 1 if the respondent is a first-year and invests someone else's money, and 0 otherwise.

The scale from 0-10 for the risky project corresponds to 0-1000 000 SEK, for example 1 on the scale equals 100 000 SEK.

9. Interpretation of the variables – The difference between the differences

The coefficients in regression (1) – (3) can be interpreted in the same way. However, the variables differ. In the following, regression (1) will be used as an example for the interpretation.

Regression (1)

$$Investment\ in\ risky\ project = \beta_0 + \beta_1 Third\text{-}year_i + \beta_2 Other's_i + \beta_3 Third\text{-}year_i \times Other's_i + \varepsilon_i$$

The intercept, β_0, can be interpreted as the amount of money (on a scale from 0-10) that has been invested in the risky project by first-years of their own money. The coefficient of β_1 is the difference between how much third-years invest of their own money in the risky project compared to first-years. β_2 tells us the difference of how much that is invested in the risky project if the first-years invest someone else's money, compared to their own money. The sum of β_1, β_2 and β_3 gives the average difference in risky investment between third-years investing someone else's money and first-years investing their own money.

The coefficient β_3 expresses the difference in differences between the two groups in each regression. The interaction effect shows how much more (or less) money one group invests in the risky project if they invest someone else's money than their own, compared to the same difference for the other group.

The difference in differences in each regression can be expressed as:

Regression (1):

(Third-years investing someone else's money - Third-years investing their own money) - (First-years investing someone else's money - First-years investing their own money)

Regression (2):

(First years investing someone else's money - First-years investing their own money) - (Non-business students investing someone else's money – Non-business students investing their own money)

Regression (3):

(Third-years investing someone else's money - Third-years investing their own money) - (Non-business students investing someone else's money – Non-business students investing their own money)

The equations above can all be written as below, using the coefficients from each regression:

$((\beta_0 + \beta_1 + \beta_2 + \beta_3) - (\beta_0 + \beta_1)) - ((\beta_0 + \beta_2) - (\beta_0)) = \beta_3$

10. Results

10.1 First-years compared to third-years

The results from regression (1) can be seen in Table 3 below (see *Appendix F*).

Hypothesis 1: Third-years are more prone to moral hazard than first-years. (Indoctrination effect)

Table 3. Regression (1)

	Variable	Coef.	Robust Std. Err.	P>|t|
Constant		3.25	.3294742	0.000
β_1	*Third-year*	1.076087	.547178	0.051
β_2	*Other's*	1.052326	.4999095	0.037
β_3	*Third-year × Other's*	-1.702737	.7655386	0.028

The constant (β_0) of 3.25, shows that first-years invest this much on a scale from 0-10 of their own money in the risky project. The third-years are, according to β_1, willing to invest 1.076087 higher on the scale when investing their own money than the first-years. However, this can only be seen as a tendency as it is only significant on a ten percent level. Although, it is very close to also being significant at a five percent level. Furthermore, the first-years invest 1.052326 (β_2) more if they invest someone else's money than their own. The interaction effect (β_3) is -1.702737. Since the coefficient is significant at a five percent level, there is a difference in how the investment behaviour changes for the two groups in a moral hazard situation. The negative sign of the interaction coefficient indicates that third-years are less prone to moral hazard. Thus, our first hypothesis is rejected at a five percent level.

In Table 4, the differences between how much is invested in the risky project for the different subgroups in the database are presented. These differences can also be calculated in the above regression, although the significance levels have been tested for in the table below (see *Appendix G*).

Table 4. Differences in investments for subgroups

Difference in investment in risky project	Coef.	Robust Std. Err.	P>|t|
First-years own money - Third-years own money	-1.076087	.547178	0.051
First-years other's money - Third-years other's money	.6266499	.5353928	0.244
First-years own money - First-years other's money	-1.052326	.4999095	0.037
Third-years own money - Third-years other's money	.6504113	.5797756	0.264

First-years invest more of other people's money than their own. It can be seen that third-years invest more of their own money than first-years, and thus are more risk willing. This is only significant at a ten percent level, but close to being significant also at a five percent level.

10.2 First-years compared to non-business students

The results from regression (2) can be seen in Table 5 below (see *Appendix F*).

Hypothesis 2*: First-years are more prone to moral hazard than non-business students. (Selection effect)*

Table 5. Regression (2)

	Variable	Coef.	Robust Std. Err.	P>|t|
Constant		3.217391	.2998927	0.000
β_1	*First-year*	.0326087	.4454502	0.942
β_2	*Other's*	.2216331	.4230142	0.601
β_3	*First-year × Other's*	.8306925	.654756	0.206

From β_0 it can be derived that non-business students invest 3.217391 on a 0-10 scale of their own money in the risky project. First-years invest 0.0326087 (β_1) more on the scale of their

own money in the risky project. Although, this coefficient is not significant. The investment increases by 0.2216331 (β_2) for non-business students investing someone else's money compared to when they invest their own. Also this coefficient is insignificant. Further, β_3 (0.8306925) is not significant either. Thus, we conclude that there is no significant difference between the differences in how first-years change their behaviour in a moral hazard situation compared to non-business students and our second hypothesis can therefore be rejected at a five percent significance level.

In Table 6, the differences between how much is invested in the risky project for the different subgroups in the database are presented. These differences can also be calculated in the above regression, although the significance levels have been tested for in the table below (see *Appendix G*).

Table 6. Differences in investments for subgroups

Difference in investment in risky project	Coef.	Robust Std. Err.	P>|t|
First-years own money – Non-business students own money	.0326087	.4454502	0.942
First-years other's money – Non-business students other's money	.8633012	.4798745	0.074
First-years own money - First-years other's money	-1.052326	.4997644	0.037
Non-business students own money – Non-business students other's money	-.2216331	.4230142	0.601

It can be seen that first-years invest more of someone else's money than their own in the risky project. At a ten percent significance level it can also be seen that first-years invest more of someone else's money in the risky project compared to non-business students.

10.3 Third-years compared to non-business students

The results from regression (3) can be seen in Table 7 below (see *Appendix F*).

Hypothesis 3*: Third-years are more prone to moral hazard than non-business. (Combined indoctrination and selection effect)*

Table 7. Regression (3)

	Variable	Coef.	Robust Std. Err.	P>|t|
Constant		3.217391	.2998927	0.000
β_1	*Third-year*	1.108696	.5297881	0.038
β_2	*Other's*	.2216331	.4230142	0.601
β_3	*Third-year × Other's*	-.8720444	.7175553	0.226

β_0 has a value of 3.217391 which means that non-business students invest this much in the risky project of their own money. β_1 is significant at a five percent level, and show that third-years invest 1.108696 grading steps more of their own money than non-business students. The β_2 coefficient of 0.2216331 shows how much more non-business students invest in the risky project when they invest someone else's money compared to their own. However, this coefficient is not significant. β_3 is also insignificant, which means that the difference between how third-years change their investment in a moral hazard situation is not significantly different from how non-business students change their investment. Thus, our third hypothesis can be rejected at a five percent significance level.

In Table 8, the differences between how much is invested in the risky project for the different subgroups in the database are presented. These differences can also be calculated in the above regression, although the significance levels have been tested for in the table below (see *Appendix G*).

Table 8. Differences in investments for subgroups

Difference in investment in risky project	Coef.	Robust Std. Err.	P>|t|
Third-years own money – Non-business students own money	1.108696	.5297881	0.038
Third-years other's money – Non-business students other's money	.2366513	.4839527	0.625
Third-years own money - Third-years other's money	.6504113	.5796073	0.263
Non-business students own money – Non-business students other's money	-.2216331	.4230142	0.601

It can be seen that third-years invest more of their own money in the risky project than non-business students do.

11. Robustness of the results

To test the robustness of our findings, we performed a Mann-Whitney U Test on the differences presented in Tables 4, 6 and 8. The Mann-Whitney U test is a non-parametric significance test that can be used when it is not possible to assume a normal distribution (Newbold et al. 2007). The results are presented in Table 9 below (see *Appendix H*).

Table 9. Mann-Whitney U test

H_0	Prob > |z|
First-years own money = Third-years own money	0.1010
First-years own money = Non business own money	0.9225
Third-years own money = Non business own money	0.0908
First-years other's money = Third-years other's money	0.2068
First-years other's money = Non business other's money	0.0878
Third-years other's money = Non business other's money	0.7601
First-years own money = First-years other's money	0.0382
Non business own money = Non business other's money	0.5660
Third-years own money = Third-years other's money	0.3989

The non-parametric tests show similar results compared to what was shown in Tables 4, 6 and 8. In Tables 4 and 6 it was observed that there was a significant difference between how first-years invested others' money compared to their own. This difference is also significant according to Mann Whitney. In Table 8 there was also a significant difference between how

much third-years and non-business students invested of their own money. However, this difference was only observed at a ten percent significance level with the non-parametric test.

Overall, the results from the Mann-Whitney U tests correspond to our OLS estimates. Only the difference between how much third-years and non-business students invest of their own money, is significant in the OLS estimate but not in the corresponding Mann-Whitney U test. Thus, we can make the conclusion that our results are relatively robust.

Furthermore, we have used the Breusch-Pagan test to test for heteroscedasticity in the three OLS regressions. Heteroscedasticity was found in regression (1) and regression (3) (see *Appendix D*). To solve this problem, we used the robust standard errors for the regressions. Heteroscedasticity means that the error variance is not the same for all values of the independent variables. This leads to incorrect standard errors and t-statistics (Wooldridge 2009).

To take into account the observed outliers in the data we estimated regressions (1) – (3) once more without them to see if they had a significant impact on the results. What we could see was that the variable *Third-year* in regression (1) became significant even at a five percent significance level. Otherwise, there were no great differences (see *Appendix J*).

To test what effect gender and age had on the investment decisions in the risky project, we estimated regressions (1) – (3) once more with the added control variables *gender* and *age*. What we could see was that none of the two variables had an impact at a five percent significance level on the investment in the risky project. (see *Appendix I*).

12. Discussion

12.1 Analysis of our findings

All three investigated hypotheses were rejected at a five percent significance level. However, another indoctrination effect than suggested by the first hypothesis was found. Our results did not support a significant selection effect and the two effects in combination were not significant either.

According to regression (1), third-years behave different compared to first-years and are less prone to moral hazard. First-years increase their investment in a moral hazard situation. Third-years also show a tendency to be less risk averse with their own money compared to first-years. Thus, our results indicate that a business education at SSE might increase the students' risk willingness with their own money, although at the same time they become more careful with someone else's investment.

Our results are not quite in line with previous studies. Frank et al. (1993) found that an economic education resulted in increased self-interest. It can be assumed that more selfish behaviour should result in a higher investment in a moral hazard situation, since someone else then bears the cost. The fact that third-years are less prone to moral hazard, despite higher initial risk willingness, then indicates the opposite to selfishness. Kahneman et al. (1986) also suggested that business students become more self-interested, and hence their findings stand in contrast to ours as well.

Economic theory has additionally been accused for encouraging unethical behaviour (Bergkvist et al. 1994). If unethical behaviour implies increased risk taking in moral hazard, our findings are not in line with these either. However, it can be discussed what unethical behaviour actually means and if it can be applied to the moral hazard dilemma. According to Ghoshal (2005) and Mitroff (2004) the theoretical framework taught in business schools has a negative influence on students' moral philosophies and attitudes. We assume that not increasing investment in a moral hazard situation is the most ethical option, since concern is then shown for someone else's possible loss. Hence, our results do not support that the framework taught in business schools should have a negative effect on the moral attitudes of the students.

Neubaum et al. (2005) on the other hand, discovered no significant difference in personal moral views of business freshmen and business seniors. However, they found that seniors were more likely to agree that other things than just economic dimensions, such as environmental and social aspects, were important. This finding is in accordance to ours concerning that third-years are less prone to moral hazard. Third-years supposedly take more aspects than economical gain into consideration when evaluating the investment decision in a moral hazard situation.

As the results indicate, risk willingness seems to increase as a result of a business education at SSE. The third-years being more risk willing could be due to learning that increased risk is

associated with a higher profitability. That the increased risk willingness of third-years is not transferred to a moral hazard situation is perhaps a cause of increased knowledge concerning agent-principal theories and the importance of trust for the functioning of financial markets.

According to regression (2) first-years and non-business students do not behave differently in a moral hazard situation. However, first-years are less careful with someone else's money than with their own, and can therefore be said to act according to moral hazard. First-years also show a tendency to invest more of someone else's money in the risky project compared to non-business students. This implies a greater willingness to take higher risks with someone else's money among first-years compared to non-business students.

The findings of Carter and Irons (1991) supported the selection hypothesis with respect to selfish behaviour. The results of Meier and Frey (2004) further indicated that business students' less pro-social behaviour was a cause of self-selection and, as suggested by Pfeffer (2005), moral attitudes of business school students might result from a selection effect. If a higher rate of self-interest, less ethical behaviour and unmoral attitudes can be said to correspond to higher risk-taking in a moral hazard situation, then our results contradict these findings.

According to regression (3) there is no difference in changed behaviour in a moral hazard situation between third-years and non-business students. However, the third-years are less risk averse with their own money compared to non-business students. The reason why the indoctrination effect combined with the selection effect are not significant, despite the indoctrination effect being significant, is that the two effects go in opposite directions.

Marwell and Ames (1981) found that economics students were much more likely to free ride than others. Free riding is a consequence of selfish behaviour and could therefore have implications on behaviour in a moral hazard situation. Other studies have also indicated that business and economics students have a tendency to act more self-interestingly than others (Carter and Irons 1991, Frank et al. 1993, Kahneman et al. 1986). As we assume that more selfish behaviour leads to higher risk taking in a moral hazard situation, our results do not support previous studies.

Sjöberg and Engelberg (2009) found that business students showed an inclination towards taking higher risks, which corresponds to our results. Third-years invest significantly more of their own money than non-business students, which implies higher risk willingness among

those. As suggested from the findings of the first hypothesis, the difference in risk willingness might be due to what students learn about risks during the education. The combined effect implies that the higher risk willingness might also be due to a selection effect. First-years show a slight tendency towards investing more of their own money than non-business students. However, this effect is small and insignificant and thereby the indoctrination effect constitutes most of the difference. Hence it can be concluded that, the majority of the effect on risk willingness is due to the education.

According to Karakowsky and Elangovan (2001), men have higher risk tolerance than women, which could have an impact on the investments in the risky project in all three regressions. However, when we controlled for gender, it was concluded that this had no significant effect on how much was invested in the risky project.

A possible explanation for why our results differ from previous research could be factors such as age and social status of our respondents. Age, social status and other similar factors might affect perceptions of risk-taking (Frankfurter et al. 2001) and thus the behaviour in a moral hazard situation. Therefore, we also controlled for age in our regressions. However, age was not found to significantly explain the investments in the risky project among our respondents. Further, differences in personality among the respondents in different studies could also affect their risk perception (Kallmen 2000), and hence our results.

It is important to recognize that we have not found any previous research on explicitly what we investigate. Although behaviour in a moral hazard situation could be affected by the components in previous research, it is not the same thing. This is an additional explanation to why our results differ from previous studies.

12.2 Validity of the study

To increase the internal validity of our thesis, certain measures were taken. None of the respondents within any of the three groups answered both types of surveys. Approximately half of each group were questioned on how they would invest their own money, and the other half how much they would invest of someone else's money. We did this to prevent the respondents' answers from being biased by comparing the two scenarios. Additionally, we included some questions in the surveys to confuse the respondents about the intention of the surveys.

One weakness in our study when testing for the differences between first-years and the other groups is that the first-years had already taken approximately 42 ECTS Credits at SSE. This could have an impact on our results, with regard to both the indoctrination and the selection effect. Further, Yezer et al. (1996) suggested that the behaviour of business students in real-life might be different compared to how they respond in surveys. This can possibly be the case in our study as well, and could have implications for how the students would invest the million if they possessed it in real money instead of fictive.

Another important aspect with the projects in the survey is that some respondents might have calculated the expected values for each project and answered according to these. Others based their decisions on intuition. It is the latter that we wanted to capture in our study. Non-business students who answered the survey at the central station did not have much time to calculate, nor did the first-years. In contrast, third-years who received the survey by email did have more time and might have based their decisions on the expected values in the two projects. Except for the time effect, another argument for decisions being based on intuition instead of expected values is other theories on decision-making under risk. An example of such a theory is the prospect theory (Kahneman and Tversky 1979), which implies that risk willingness is determined by whether there is a possibility to win or lose something, rather than what the final outcome is.

When choosing respondents from the general public to compare with business students at SSE, we only questioned people in approximately the same age interval as the students. The reason for this was to make the groups comparable. We wanted the characteristics of the two groups to be as similar as possible in all aspects apart from education, in order to isolate this effect. Since answering our survey was voluntary, there could also be a self-selection bias, which could lead to unrepresentative answers. However, this effect might be reduced due to the fact that none of the respondents knew what the survey was about when they agreed to participate. For example, the probability is low that people especially good at evaluating risk agreed to participate to a larger extent than others.

12.3 Generalization and future research

Our results indicate that a business education at SSE does not increase risk-willingness in a moral hazard situation on an individual level. Whether we can make conclusions from our study concerning the Swedish financial industry depends on the external validity of the thesis (Mitchell and Jolley 2001).

A primary weakness of our external validity is that our respondents' average age was in the interval 20-24 years. The characteristics among people of this age might be quite different to decision makers in the financial industry, who most probably are older. Furthermore, it cannot be assumed that all active decision makers in the financial industry have a business education. Changed behaviour in a moral hazard situation can also be due to other characteristics than education. For example, Bergkvist et al. (2004) suggested that the norms developed within the financial industry might influence behaviour more than earlier education.

In our study, risk averseness seems to decrease due to a business education at SSE. This could affect behaviour in the individuals' future professional lives, although it cannot be concluded with certainty. However, third-years being less prone to moral hazard compared to first-years indicate that concern for others and a sense of responsibility might increase during the education. This could also have a possible effect on the behaviour in the students' future careers. Additionally it is not known whether the respondents in our study will work within the financial industry. Although, according to the SSE placement report (2010), the largest share of graduating students 2009 were recruited into the investment banking- or finance/banking industry.

Whether SSE is representative for a business education in general can be discussed. Since SSE is a private school and less dependent on the government than other universities such as the Stockholm University and the Gothenburg University, the teaching methods might differ and thereby its effects on students. However, as SSE introduced the Bologna educational system the curriculum should be similar to other universities in Europe. On the other hand, other geographic locations and cultures might affect the form of education and thus also its consequences.

Since we have only carried out our tests on an individual level an interesting topic for future research would be to test behaviour in a moral hazard situation on an organizational level. It would also be interesting to investigate if risk taking in moral hazard situations increases during adverse economical conditions.

12.4 Summary

The attention drawn to market failures during the recent financial crisis makes it worthwhile to study behaviour in a moral hazard situation. Since the largest share of graduating students from SSE 2009, were recruited into the investment banking- or finance/banking industry, the

effect of a business and economics education on behaviour in a moral hazard situation was found worth to investigate.

The purpose of our thesis was to investigate how a business and economics education, more precisely an education at SSE affects students' behaviour in a moral hazard situation (Indoctrination effect). Additionally, we investigated if a certain type of person chooses to study at SSE with regard to the same type of behaviour (Selection effect). The combined effect of a business education and a certain type choosing to study at SSE were investigated as well (Indoctrination and Selection effects). To fully evaluate the effect of a moral hazard situation, we also tested for the risk willingness of the individuals.

To investigate the three effects, we primarily used three OLS regressions. No selection effect was found with regard to moral hazard behaviour, and the selection effect in combination with the indoctrination effect was not significant either. However, third-years were shown to be more risk willing with their own money than first-years and non-business students. Moreover, third-years were less prone to moral hazard than first-years. First-years in turn, were more risk willing in a moral hazard situation. In the future, research on moral hazard behaviour on an organizational level is suggested, to further understand what these findings could imply for the financial industry.

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Appendix A. Surveys

A1. First page (First-years)

Gender

- ○ Male
- ○ Female

Age

_____

How many ECTS Credits have you taken at the Stockholm School of Economics?

_____

Which specializations do you think you will choose in your third year? (Choose two)

- ☐ Marketing
- ☐ Management
- ☐ Finance
- ☐ Economics
- ☐ Accounting

How important is a high income to you?

Not important									Very important
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

How many hours/week can you consider working after finished studies? (40h/week = full time)

_____

A2. First page (Non-business students)

Gender

- Male
- Female

Age

Do you study business/economics?

- Yes
- No

How important is a high income to you?

Not important									Very important
1	2	3	4	5	6	7	8	9	10

How many hours/week can you consider working after finished studies? (40h/week = full time)

A3. First page (Third-years)

Gender

- Male
- Female

Age

How many ECTS Credits have you taken at the Stockholm School of Economics?

Which specializations have you chosen?

- Marketing
- Management
- Finance
- Economics
- Accounting

How important is a high income to you?

Not important									Very important
1	2	3	4	5	6	7	8	9	10

How many hours/week can you consider working after finished studies? (40h/week = full time)

A4. Second page Survey 1 – The respondent invests his/her own money

You receive 1 million SEK and must invest these. There are two projects to choose between, and you have to decide how much to invest in each of the two projects. You have to divide the million in such a way that the whole million is invested.

How do you choose to invest the million in the two projects below?

Project 1:

In this project the chances are 25% that the invested amount is multiplied by 8. At the same time there is a risk of 75% that you will lose the whole invested amount.

You choose to invest:

(Thousand SEK)

0	100	200	300	400	500	600	700	800	900	1000
○	○	○	○	○	○	○	○	○	○	○

Project 2:

In this project the chances are 75% that the invested amount will be multiplied by 2. At the same time there is a risk of 25% that you will lose the whole invested amount.

You choose to invest:

(Thousand SEK)

0	100	200	300	400	500	600	700	800	900	1000
○	○	○	○	○	○	○	○	○	○	○

Note! You decide how to divide the million between the two projects above, but the total amount invested must equal 1 million.

If you had to invest the whole million in just one of the projects, which one would you choose?

○ Project 1

○ Project 2

A5. Second page Survey 2 – The respondent invests someone else's money

You are to invest 1 million SEK for another person. There are two projects to choose from and you decide how much of the million to invest in each of the projects. You have to divide the money in such a way that the whole million is invested.

How do you choose to invest the million in the two projects below?

Project 1:

In this project there is a chance of 25% that the invested amount is multiplied by 8. At the same time there is a risk of 75% that the whole invested amount is lost. If the money is multiplied by 8, you receive 40% of the gain. If the money is lost, the other person loses the whole invested amount, but you do not have to pay anything.

You choose to invest:

(Thousand SEK)

0	100	200	300	400	500	600	700	800	900	1000
○	○	○	○	○	○	○	○	○	○	○

Project 2:

In this project there is a chance of 75% that the invested amount is multiplied by 2. At the same time there is a risk of 25% that the whole invested amount is lost. If the money is multiplied by 2, you receive 40% of the gain. If the money is lost, the other person loses the whole invested amount, but you do not have to pay anything.

You choose to invest:

(Thousand SEK)

0	100	200	300	400	500	600	700	800	900	1000
○	○	○	○	○	○	○	○	○	○	○

Note! You decide how to divide the million between the two projects above, but the total amount invested must equal 1 million.

If you had to invest the whole million in just one of the projects, which one would you choose?

○ Project 1

○ Project 2

Appendix B. Descriptive characteristics for the six subgroups

First-years (investing their own money)

Variable	Obs	Mean	Std. Dev.	Min	Max
age	40	20.7	2.344661	18	33
ects	40	42.375	6.016803	22.5	45
income	40	7.55	1.616422	2	10
workhours	40	56.3	14.44388	30	100
project1	40	3.25	2.084743	0	10

First-years (investing someone else's money)

Variable	Obs	Mean	Std. Dev.	Min	Max
age	43	20.53488	1.652543	19	28
ects	43	41.33721	7.015053	22.5	45
income	43	7.627907	1.890115	1	10
workhours	43	58.88372	15.29116	30	100
project1	43	4.302326	2.464364	0	10

Third-years (investing their own money)

Variable	Obs	Mean	Std. Dev.	Min	Max
age	46	22.76087	1.268153	21	26
ects	46	153.0978	11.69265	110	180
income	46	7.565217	1.55852	3	10
workhours	45	63.11111	15.78581	40	100
project1	46	4.326087	2.959387	0	10

Third-years (investing someone else's money)

Variable	Obs	Mean	Std. Dev.	Min	Max
age	37	23.45946	2.456223	21	34
ects	37	147.7027	15.68326	112.5	180
income	37	7	1.414214	3	10
workhours	37	58.78378	11.4507	40	80
project1	37	3.675676	2.322045	0	10

Non-business students (investing their own money)

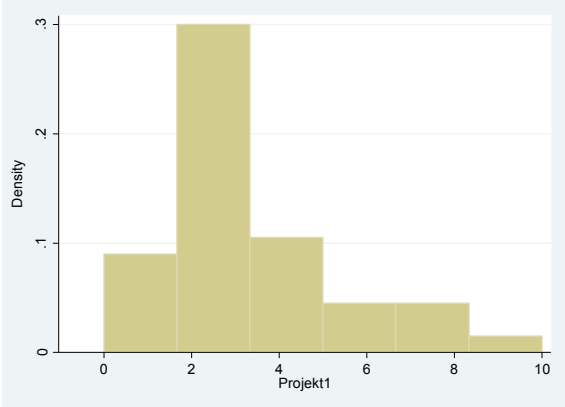
Variable	Obs	Mean	Std. Dev.	Min	Max
age	46	20.78261	2.421322	18	26
income	46	6.76087	1.840106	3	10
workhours	46	45.3913	12.73399	20	100
project1	46	3.217391	2.032109	0	10

Non-business students (investing someone else's money)

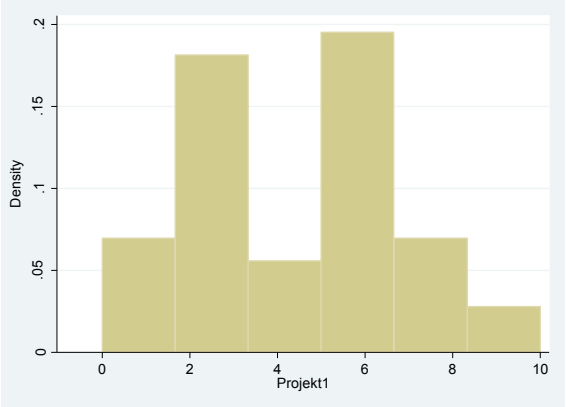
Variable	Obs	Mean	Std. Dev.	Min	Max
age	39	22.61538	2.231537	18	26
income	41	6.658537	1.811212	1	10
workhours	40	45.375	9.363561	30	70
project1	41	3.439024	1.911136	0	8

Appendix C. Distributions for investment in Project 1

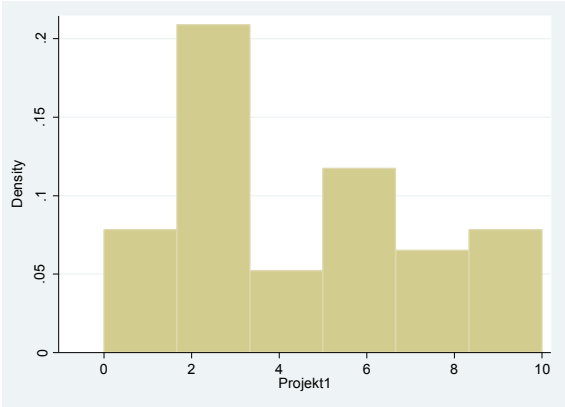
First-years (own money)



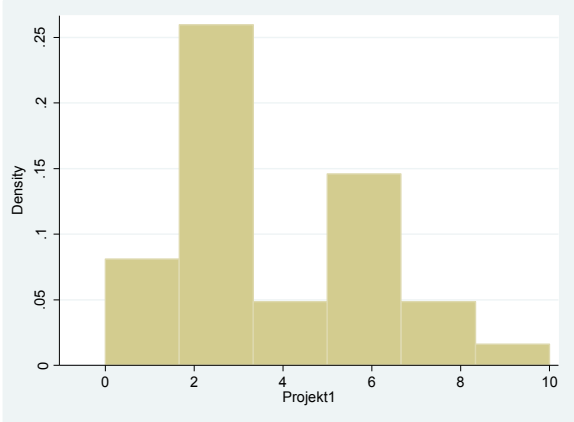
First-years (other's money)



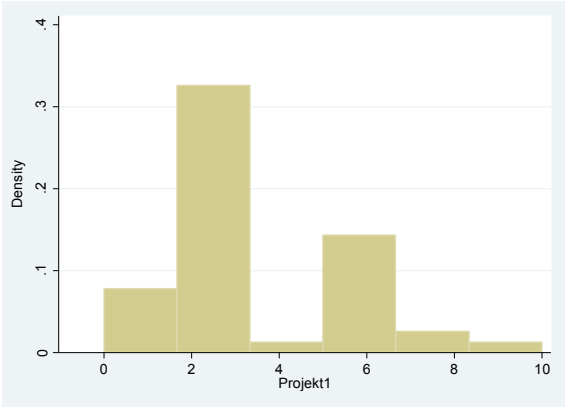
Third-years (own money)



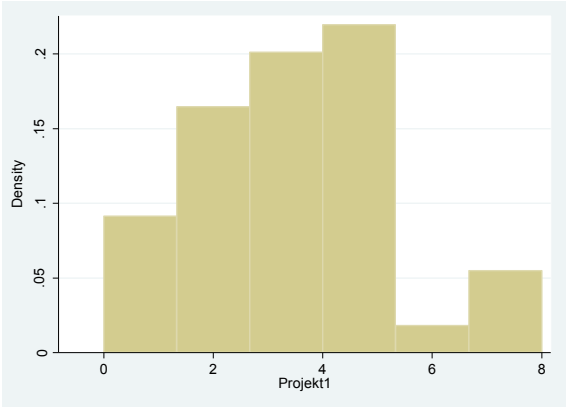
Third-years (other's money)



Non-business students (own money)



Non-business students (other's money)



Appendix D. Test for Heteroskedasticity

Regression (1)

```
      Source |       SS       df       MS              Number of obs =     166
-------------+------------------------------           F(  3,   162) =    1.81
       Model |  34.0327059     3  11.3442353            Prob > F      =  0.1466
    Residual |  1012.78657   162  6.25176896            R-squared     =  0.0325
-------------+------------------------------           Adj R-squared =  0.0146
       Total |  1046.81928   165  6.34435926            Root MSE      =  2.5004

------------------------------------------------------------------------------
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   thirdyear |    1.076087   .5405573     1.99   0.048     .0086398    2.143534
      others |    1.052326   .5492579     1.92   0.057    -.0323026    2.136954
 thirdothers |   -1.702737   .7788189    -2.19   0.030    -3.240683   -.1647908
       _cons |        3.25   .3953406     8.22   0.000     2.469315    4.030685
------------------------------------------------------------------------------
```

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of project1

         chi2(1)      =     4.02
         Prob > chi2  =   0.0449
```

Regression (2)

```
      Source |       SS       df       MS              Number of obs =     170
-------------+------------------------------           F(  3,   166) =    2.45
       Model |   33.530114     3  11.1767047            Prob > F      =  0.0652
    Residual |  756.493415   166  4.55718925            R-squared     =  0.0424
-------------+------------------------------           Adj R-squared =  0.0251
       Total |  790.023529   169  4.67469544            Root MSE      =  2.1348

------------------------------------------------------------------------------
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   firstyear |    .0326087   .4615182     0.07   0.944    -.8785934    .9438108
      others |    .2216331   .4584979     0.48   0.629    -.6836057    1.126872
 firstothers |    .8306925   .6558439     1.27   0.207    -.4641779    2.125563
       _cons |    3.217391   .3147528    10.22   0.000     2.595957    3.838826
------------------------------------------------------------------------------
```

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of project1

         chi2(1)      =     2.78
         Prob > chi2  =   0.0952
```

Regression (3)

```
      Source |       SS       df       MS              Number of obs =     170
-------------+------------------------------           F(  3,   166) =    1.89
       Model |  31.4124895     3  10.4708298           Prob > F      =  0.1334
    Residual |  920.140452   166  5.54301477           R-squared     =  0.0330
-------------+------------------------------           Adj R-squared =  0.0155
       Total |  951.552941   169  5.63049078           Root MSE      =  2.3544

------------------------------------------------------------------------------
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   thirdyear |    1.108696   .4909182     2.26   0.025     .1394476    2.077944
      others |    .2216331   .5056637     0.44   0.662     -.776728    1.219994
 thirdothers |   -.8720444   .7252636    -1.20   0.231    -2.303974    .5598855
       _cons |    3.217391   .3471316     9.27   0.000     2.532029    3.902753
------------------------------------------------------------------------------
```

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of project1

         chi2(1)      =    10.84
         Prob > chi2  =   0.0010
```

Appendix E. Test for Multicollinearity

Regression (1)

```
. corr thirdyear others
(obs=166)
             | thirdyear others
-------------+------------------
   thirdyear |   1.0000
      others |  -0.0723   1.0000


. corr  others thirdothers
(obs=166)
             |   others thirdothers
-------------+------------------
      others |   1.0000
 thirdothers |   0.5553   1.0000

. corr  thirdyear thirdothers
(obs=166)
             | thirdyear thirdothers
-------------+------------------
   thirdyear |   1.0000
 thirdothers |   0.5356   1.0000
```

Regression (2)

```
. corr  firstothers firstyear
(obs=170)
             | firstothers firstyear
-------------+------------------
 firstothers |   1.0000
   firstyear |   0.5957   1.0000


. corr others firstyear
(obs=170)
             |   others  firstyear
-------------+------------------
      others |   1.0000
   firstyear |   0.0468   1.0000


. corr others firstothers
(obs=170)
             |   others firstothers
-------------+------------------
      others |   1.0000
 firstothers |   0.5888   1.0000
```

Regression (3)

```
. corr  others thirdyear
(obs=170)
             |   others thirdyear
-------------+------------------
      others |   1.0000
   thirdyear |  -0.0256   1.0000
. corr others thirdothers
(obs=170)
             |   others thirdothers
-------------+------------------
      others |   1.0000
 thirdothers |   0.5728   1.0000


. corr thirdothers thirdyear
(obs=170)
             |thirdothers thirdyear
-------------+------------------
 thirdothers |   1.0000
   thirdyear |   0.5400   1.0000
```

Appendix F. Regression (1) – (3)

Regression (1)

```
Linear regression                                      Number of obs =     166
                                                       F(  3,   162) =    2.04
                                                       Prob > F      =  0.1102
                                                       R-squared     =  0.0325
                                                       Root MSE      =  2.5004

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   thirdyear |    1.076087    .547178     1.97   0.051    -.0044341    2.156608
      others |    1.052326   .4999095     2.11   0.037     .0651463    2.039505
 thirdothers |   -1.702737   .7655386    -2.22   0.028    -3.214458   -.1910158
       _cons |        3.25   .3294742     9.86   0.000     2.599382    3.900618
------------------------------------------------------------------------------
```

Regression (2)

```
Linear regression                                      Number of obs =     170
                                                       F(  3,   166) =    2.02
                                                       Prob > F      =  0.1132
                                                       R-squared     =  0.0424
                                                       Root MSE      =  2.1348

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   firstyear |    .0326087   .4454502     0.07   0.942    -.8468693    .9120867
      others |    .2216331   .4230142     0.52   0.601    -.6135482    1.056814
 firstothers |    .8306925    .654756     1.27   0.206    -.4620301    2.123415
       _cons |    3.217391   .2998927    10.73   0.000     2.625296    3.809487
------------------------------------------------------------------------------
```

Regression (3)

```
Linear regression                                      Number of obs =     170
                                                       F(  3,   166) =    1.54
                                                       Prob > F      =  0.2048
                                                       R-squared     =  0.0330
                                                       Root MSE      =  2.3544

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   thirdyear |    1.108696   .5297881     2.09   0.038     .0627045    2.154687
      others |    .2216331   .4230142     0.52   0.601    -.6135482    1.056814
 thirdothers |   -.8720444   .7175553    -1.22   0.226    -2.288755    .5446664
       _cons |    3.217391   .2998927    10.73   0.000     2.625296    3.80948
------------------------------------------------------------------------------
```

Appendix G. Regressions with subgroups

Regression 1.1 (Database third-years and first-years)

```
Linear regression                                      Number of obs =     166
                                                       F(  3,   162) =    2.04
                                                       Prob > F      =  0.1102
                                                       R-squared     =  0.0325
                                                       Root MSE      =  2.5004

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    firstown |  -1.052326   .4999095    -2.11   0.037    -2.039505   -.0651463
    thirdown |   .0237614   .5763739     0.04   0.967    -1.114413    1.161936
 thirdothers |  -.6266499   .5353928    -1.17   0.244    -1.683899    .4305988
       _cons |   4.302326   .3759738    11.44   0.000     3.559884    5.044767
------------------------------------------------------------------------------
```

Regression 1.2 (Database third-years and first-years)

```
Linear regression                                      Number of obs =     166
                                                       F(  3,   162) =    2.04
                                                       Prob > F      =  0.1102
                                                       R-squared     =  0.0325
                                                       Root MSE      =  2.5004

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    firstown |  -1.076087    .547178    -1.97   0.051    -2.156608    .0044341
 firstothers |  -.0237614   .5763739    -0.04   0.967    -1.161936    1.114413
 thirdothers |  -.6504113   .5797756    -1.12   0.264    -1.795303    .4944807
       _cons |   4.326087   .4368645     9.90   0.000     3.463404     5.18877
------------------------------------------------------------------------------
```

Regression 1.3 (Database third-years and first-years)

```
Linear regression                                      Number of obs =     166
                                                       F(  3,   162) =    2.04
                                                       Prob > F      =  0.1102
                                                       R-squared     =  0.0325
                                                       Root MSE      =  2.5004

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    firstown |  -.4256757   .5038278    -0.84   0.399    -1.420592     .569241
 firstothers |   .6266499   .5353928     1.17   0.244    -.4305988    1.683899
    thirdown |   .6504113   .5797756     1.12   0.264    -.4944807    1.795303
       _cons |   3.675676   .3811682     9.64   0.000     2.922977    4.428375
------------------------------------------------------------------------------
```

Regression 2.1 (Database first-years and non-business students)

```
Linear regression                                      Number of obs =     170
                                                       F(  3,   166) =    2.02
                                                       Prob > F      =  0.1132
                                                       R-squared     =  0.0424
                                                       Root MSE      =  2.1348

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    firstown |  -1.052326   .4997644    -2.11   0.037    -2.039039   -.0656119
   nonbusown |  -1.084934   .4808429    -2.26   0.025     -2.03429   -.1355784
nonbusothers |  -.8633012   .4798745    -1.80   0.074    -1.810745    .0841428
       _cons |   4.302326   .3758646    11.45   0.000     3.560234    5.044417
------------------------------------------------------------------------------
```

Regression 2.2 (Database first-years and non-business students)

```
Linear regression                                      Number of obs =     170
                                                       F(  3,   166) =    2.02
                                                       Prob > F      =  0.1132
                                                       R-squared     =  0.0424
                                                       Root MSE      =  2.1348

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    firstown |   .0326087   .4454502     0.07   0.942    -.8468693    .9120867
 firstothers |   1.084934   .4808429     2.26   0.025     .1355784     2.03429
nonbusothers |   .2216331   .4230142     0.52   0.601    -.6135482    1.056814
       _cons |   3.217391   .2998927    10.73   0.000     2.625296    3.809487
------------------------------------------------------------------------------
```

Regression 2.3 (Database first-years and non-business students)

```
Linear regression                                      Number of obs =     170
                                                       F(  3,   166) =    2.02
                                                       Prob > F      =  0.1132
                                                       R-squared     =  0.0424
                                                       Root MSE      =  2.1348

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    firstown |  -.1890244   .4444047    -0.43   0.671    -1.066438    .6883895
 firstothers |   .8633012   .4798745     1.80   0.074    -.0841428    1.810745
   nonbusown |  -.2216331   .4230142    -0.52   0.601    -1.056814    .6135482
       _cons |   3.439024   .2983376    11.53   0.000     2.849999     4.02805
------------------------------------------------------------------------------
```

Regression 3.1 (Database third-years and non-business students)

```
Linear regression                                      Number of obs =     170
                                                       F(  3,   166) =    1.54
                                                       Prob > F      =  0.2048
                                                       R-squared     =  0.0330
                                                       Root MSE      =  2.3544

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
nonbusothers |   .2216331   .4230142     0.52   0.601    -.6135482    1.056814
    thirdown |   1.108696   .5297881     2.09   0.038     .0627045    2.154687
 thirdothers |   .4582844   .4849129     0.95   0.346    -.4991071    1.415676
       _cons |   3.217391   .2998927    10.73   0.000     2.625296    3.809487
------------------------------------------------------------------------------
```

Regression 3.2 (Database third-years and non-business students)

```
Linear regression                                      Number of obs =     170
                                                       F(  3,   166) =    1.54
                                                       Prob > F      =  0.2048
                                                       R-squared     =  0.0330
                                                       Root MSE      =  2.3544

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   nonbusown |  -.2216331   .4230142    -0.52   0.601    -1.056814    .6135482
    thirdown |   .8870626   .5289093     1.68   0.095    -.1571937    1.931319
 thirdothers |   .2366513   .4839527     0.49   0.625    -.7188444    1.192147
       _cons |   3.439024   .2983376    11.53   0.000     2.849999     4.02805
------------------------------------------------------------------------------
```

Regression 3.3 (Database third-years and non-business students)

```
Linear regression                                      Number of obs =     170
                                                       F(  3,   166) =    1.54
                                                       Prob > F      =  0.2048
                                                       R-squared     =  0.0330
                                                       Root MSE      =  2.3544

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   nonbusown |  -.4582844   .4849129    -0.95   0.346    -1.415676    .4991071
nonbusothers |  -.2366513   .4839527    -0.49   0.625    -1.192147    .7188444
    thirdown |   .6504113   .5796073     1.12   0.263    -.4939408    1.794763
       _cons |   3.675676   .3810575     9.65   0.000     2.923332     4.42802
------------------------------------------------------------------------------
```

Appendix H. Mann-Whitney U test

Database: first-years own money and third-years own money

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

 firstyearown|      obs    rank sum    expected
-------------+---------------------------------
           0 |       46        2188        2001
           1 |       40        1553        1740
-------------+---------------------------------
    combined |       86        3741        3741

unadjusted variance    13340.00
adjustment for ties     -337.79
                     ----------
adjusted variance      13002.21

Ho: project1(firsty~n==0) = project1(firsty~n==1)
             z =   1.640
    Prob > |z| =   0.1010
```

Database: first-years own money and non-business students own money

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

firstyearown |      obs    rank sum    expected
-------------+---------------------------------
           0 |       46        1990        2001
           1 |       40        1751        1740
-------------+---------------------------------
    combined |       86        3741        3741

unadjusted variance    13340.00
adjustment for ties     -550.62
                     ----------
adjusted variance      12789.38

Ho: project1(firsty~n==0) = project1(firsty~n==1)
             z =  -0.097
    Prob > |z| =   0.9225
```

Database: third-years own money and non-business students own money

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

thirdyearown |      obs    rank sum    expected
-------------+---------------------------------
           0 |       46        1926        2139
           1 |       46        2352        2139
-------------+---------------------------------
    combined |       92        4278        4278

unadjusted variance    16399.00
adjustment for ties     -532.66
                     ----------
adjusted variance      15866.34

Ho: project1(thirdy~n==0) = project1(thirdy~n==1)
             z =  -1.691
    Prob > |z| =   0.0908
```

Database: first-year students other's money and third-years other's money

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

firstyearothers |      obs    rank sum    expected
   -------------+---------------------------------
              0 |       37        1369      1498.5
              1 |       43        1871      1741.5
   -------------+---------------------------------
       combined |       80        3240        3240

unadjusted variance    10739.25
adjustment for ties     -216.37
                     ----------
adjusted variance      10522.88

Ho: project1(firsty~s==0) = project1(firsty~s==1)
             z =  -1.262
    Prob > |z| =   0.2068
```

Database: first-years other's money and non-business students other's money

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

 firstyearothers |      obs    rank sum    expected
   -------------+---------------------------------
              0 |       41        1554      1742.5
              1 |       43        2016      1827.5
   -------------+---------------------------------
       combined |       84        3570        3570

unadjusted variance    12487.92
adjustment for ties     -291.94
                     ----------
adjusted variance      12195.98

Ho: project1(firsty~s==0) = project1(firsty~s==1)
             z =  -1.707
    Prob > |z| =   0.0878
```

Database: third-years other's money and non-business students other's money

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

thirdyearothers |      obs    rank sum    expected
   -------------+---------------------------------
              0 |       41      1589.5      1619.5
              1 |       37      1491.5      1461.5
   -------------+---------------------------------
       combined |       78        3081        3081

unadjusted variance     9986.92
adjustment for ties     -337.32
                     ----------
adjusted variance       9649.60

Ho: project1(thirdy~s==0) = project1(thirdy~s==1)
             z =  -0.305
    Prob > |z| =   0.7601
```

Database: first-year students (own and other's money)

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

firstyearown |      obs    rank sum    expected
-------------+---------------------------------
           0 |       43        2031        1806
           1 |       40        1455        1680
-------------+---------------------------------
    combined |       83        3486        3486

unadjusted variance    12040.00
adjustment for ties     -259.42
                     ----------
adjusted variance      11780.58

Ho: project1(firsty~n==0) = project1(firsty~n==1)
             z =   2.073
    Prob > |z| =   0.0382
```

Database: non-business students (own and other's money)

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

nonbusinessown |      obs    rank sum    expected
  -------------+---------------------------------
             0 |       41        1870        1804
             1 |       46        1958        2024
  -------------+---------------------------------
      combined |       87        3828        3828

unadjusted variance    13830.67
adjustment for ties     -610.64
                     ----------
adjusted variance      13220.02

Ho: project1(nonbus~n==0) = project1(nonbus~n==1)
             z =   0.574
    Prob > |z| =   0.5660
```

Database: third-years (own and other's money)

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

   thirdyearown |      obs    rank sum    expected
   -------------+---------------------------------
              0 |       37        1463        1554
              1 |       46        2023        1932
   -------------+---------------------------------
       combined |       83        3486        3486

unadjusted variance    11914.00
adjustment for ties     -278.58
                     ----------
adjusted variance      11635.42

Ho: project1(thirdy~n==0) = project1(thirdy~n==1)
             z =  -0.844
    Prob > |z| =   0.3989
```

Appendix I. Regression (1) – (3) with control variables

Regression (1) with control variables

```
Linear regression                               Number of obs =     166
                                                F(  5,   160) =    1.29
                                                Prob > F      =  0.2707
                                                R-squared     =  0.0337
                                                Root MSE      =  2.5144

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   thirdyear |    .984429   .5691414     1.73   0.086    -.1395692    2.108427
      others |   1.059953   .5090334     2.08   0.039     .0546617    2.065244
 thirdothers |  -1.735359    .761227    -2.28   0.024    -3.238707   -.2320103
      gender |  -.0272208   .3870181    -0.07   0.944    -.7915435     .737102
         age |   .0437001   .1044218     0.42   0.676    -.1625228    .2499229
       _cons |   2.384878   2.262194     1.05   0.293    -2.082732    6.852489
------------------------------------------------------------------------------
```

Regression (2) with control variables

```
Linear regression                               Number of obs =     168
                                                F(  5,   162) =    1.46
                                                Prob > F      =  0.2058
                                                R-squared     =  0.0464
                                                Root MSE      =  2.1528

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   firstyear |    .084545   .4917858     0.17   0.864    -.8865921    1.055682
      others |   .3816023   .4381507     0.87   0.385    -.4836209    1.246825
 firstothers |   .6590722   .6762547     0.97   0.331    -.6763387    1.994483
      gender |   .1698128    .385381     0.44   0.660    -.5912052    .9308307
         age |  -.0550171   .0663104    -0.83   0.408    -.1859612     .075927
       _cons |    4.05808   1.555477     2.61   0.010     .9864554    7.129705
------------------------------------------------------------------------------
```

Regression (3) with control variables

```
Linear regression                               Number of obs =     168
                                                F(  5,   162) =    1.40
                                                Prob > F      =  0.2260
                                                R-squared     =  0.0477
                                                Root MSE      =   2.361

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   thirdyear |   .7644235   .5577929     1.37   0.172    -.3370589    1.865906
      others |   .0148275   .4569235     0.03   0.974    -.8874665    .9171216
 thirdothers |  -.7134516   .7310188    -0.98   0.331    -2.157006    .7301029
      gender |  -.2148376   .4183367    -0.51   0.608    -1.040934    .6112584
         age |   .1315323   .0788379     1.67   0.097    -.0241502    .2872148
       _cons |   .8667783   1.849274     0.47   0.640    -2.785012    4.518568
------------------------------------------------------------------------------
```

Appendix J. Regression (1) – (3) without outliers

Regression (1) without outliers

```
Linear regression                                      Number of obs =     165
                                                       F(  3,   161) =    3.11
                                                       Prob > F      =  0.0282
                                                       R-squared     =  0.0431
                                                       Root MSE      =  2.4496

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   thirdyear |    1.249164   .5230685     2.39   0.018      .216204    2.282124
      others |    1.225403   .4733909     2.59   0.011     .2905463    2.160259
 thirdothers |   -1.875814   .7485245    -2.51   0.013    -3.354006   -.3976214
       _cons |    3.076923   .2876135    10.70   0.000     2.508942    3.644904
------------------------------------------------------------------------------
```

Regression (2) without outliers

```
Linear regression                                      Number of obs =     168
                                                       F(  3,   164) =    2.85
                                                       Prob > F      =  0.0392
                                                       R-squared     =  0.0612
                                                       Root MSE      =  2.0102

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   firstyear |    .0102564   .3910241     0.03   0.979    -.7618341    .7823469
      others |    .3723577   .3990562     0.93   0.352    -.4155926    1.160308
  firstother |    .8530448   .6190682     1.38   0.170    -.3693268    2.075416
       _cons |    3.066667   .2649811    11.57   0.000     2.543452    3.589881
------------------------------------------------------------------------------
```

Regression (3) without outliers

```
Linear regression                                      Number of obs =     169
                                                       F(  3,   165) =    2.15
                                                       Prob > F      =  0.0955
                                                       R-squared     =  0.0419
                                                       Root MSE      =  2.3003

------------------------------------------------------------------------------
             |               Robust
    project1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   thirdyear |     1.25942    .510854     2.47   0.015     .2507669    2.268074
      others |    .3723577   .3990274     0.93   0.352    -.4155003    1.160216
 thirdothers |   -1.022769   .7037154    -1.45   0.148    -2.412217    .3666788
       _cons |    3.066667    .264962    11.57   0.000     2.543514     3.58982
------------------------------------------------------------------------------
```