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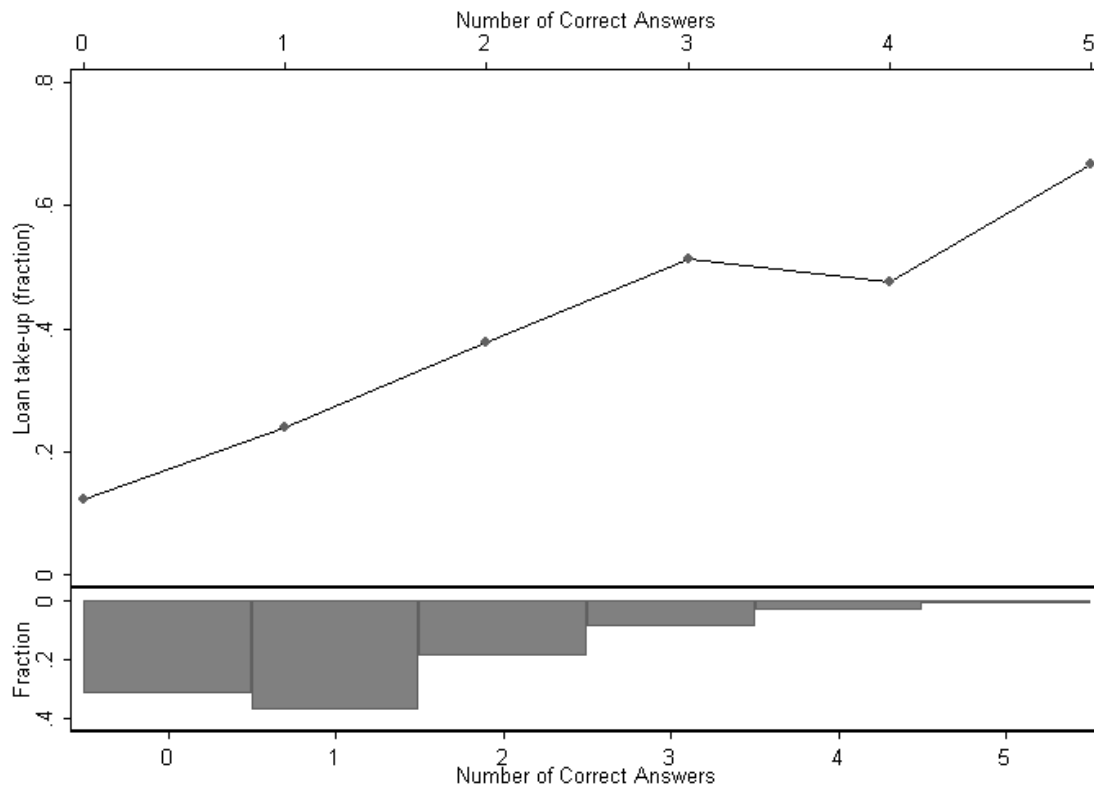
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5.1 Introduction

Most developed countries substantially subsidize college enrollment through financial aid and subsidies to public institutions. When individuals seek to finance their education they will find it difficult to take out a commercial loan because of the absence of collateral and the presence of moral hazard. Financial aid in the form of grants or attractive loans are aimed at lifting credit constraints. There is, however, evidence that students underutilize financing possibilities in the forms of loans. Some have suggested that this is due to debt aversion which occurs when having a debt lowers utility over and above its impact on life-time consumption patterns (e.g. Field 2006; Oosterbeek and van den Broek 2008). Put differently, debt aversion arises when individuals not only care about their consumption profile, but also assign negative weight to having debt at a certain point in time, which decreases borrowing.

Another barrier to student loan take-up is information. If students are imperfectly or incorrectly informed about loan conditions, take-up rates on student loans will be suboptimal and may reduce investment in post-secondary education. In defense of a shift towards a more prominent role for loans, the former Dutch (vice-) minister responsible for higher education, Mark Rutte, argued that instead of debt aversion, the key factor explaining the low take-up rate in the Netherlands (35%) is the uninformedness of students about the generous loan conditions. He based this view on a study showing that students who are well informed about the loan conditions are also significantly more likely to have a student loan.

* This paper is based on Booij et al. (2008).

Figure 5.1: Knowledge about loan conditions and loan take-up rates

The top panel of Figure 5.1 shows the strong correlation between informedness and borrowing based on the data used in this chapter. For every correct answer about the loan conditions the take-up rate increases by roughly ten percentage points. At the same time the bottom panel shows that indeed many students are rather poorly informed about the loan conditions (over 70% gives a correct answer to not more than one out of five questions). This suggests that by better informing students the overall take-up rate will increase. This will obviously not happen if the relation in Figure 5.1 arises because students who are more interested in taking a loan also gather more information about the loan conditions, or that those who have taken out such a loan receive information about the loan conditions.

We conducted a randomized experiment to estimate the causal effect of better knowledge about loan conditions on loan take-up. Randomly fifty percent of the students who responded to an Internet questionnaire were given factual information about loan

conditions, whereas the other half did not receive such information.³⁷ Half a year later, the respondents were interviewed again. Those who were exposed to treatment turn out to have significantly more accurate knowledge about loan conditions, thereby indicating that the supply of information has an impact on knowledge six months later. At the same time, exposure to the information treatment and possessing more accurate knowledge appears to have no impact on the loan take-up rate, thereby rendering the claim of the higher education (vice-) minister invalid.

This chapter proceeds as follows. The next section provides more details of the student financial aid scheme in the Netherlands and the recent policy discussion related to that. Section 5.3 describes the experimental design and the empirical approach based on it. Section 5.4 introduces the data and section 5.5 presents and discusses the empirical results. Section 5.6 summarizes and concludes.

5.2 Background

The student financial aid system run by the Dutch government consists of three components: (i) a basic grant provided to all students; (ii) an additional grant for students from low income families; and (iii) a student loan scheme with a mortgage type repayment. Although the system changed several times after its introduction in 1986 (Belot et al. 2004), these three components have been part of the loan scheme since the start.

In 2007, the year of this study, the basic grant equaled € 290 per month, with an additional means-tested supplementary grant of € 250 per month at maximum. Additionally, all students were allowed to borrow an additional amount until their total financial aid from the government equaled € 790 at maximum. Hence, for students that do not receive the supplementary grant, the maximum loan amount was € 500. The basic and supplementary grants are given for 4 or for 5 years, depending on the length of the curriculum. After this period there is an extended loan period of three years in which students can borrow a maximum of € 790 per month.

³⁷ Another study which manipulates the amount of information in an experimental setting is Duflo and Saez (2003). They, however, focus on the role of social interactions which do not play a role in this study since treated and controls are not connected.

If the student does not obtain a diploma within ten years, the received grants are transformed into a loan. The interest rate on the loan is equal to that of long term government bonds (3.7% in 2007), which is well below individual borrowing rates in the Netherlands.³⁸ Repayment of the total debt starts after a grace period of 2 years. The monthly repayment amount is calculated as an annuity such that the total debt is repaid in exactly 15 years. However, the monthly installments are € 45 at minimum. In months when monthly income is below a certain threshold the installment is forgiven. This implies that students with low future incomes will not repay their entire debt.

Compared to financial aid schemes in other countries, the Dutch scheme is rather generous. Few other countries provide basic grants to all students, and if they do the amounts are smaller (Usher and Cervenán 2005). Also, only about half of the governments of OECD countries offer loan schemes to students, most of which contain no provision in case of low future incomes (Usher 2005). Not surprisingly, the Dutch higher education system was ranked in the top three in terms of affordability in an international comparative study of 16 countries conducted by Usher and Cervenán (2005).

While the grant given to students in the Netherlands is large in comparison with grants given elsewhere, it is insufficient to cover living costs and education expenditures. Hence it could be expected that students would make use of the loans scheme to supplement their income, as is observed in other countries. In Sweden for example, where the government offers a basic grant of similar magnitude as in the Netherlands, more than 85% of students take a loan. Similar take-up rates are observed in other countries (Norway: 78%, U.K.: 85%, US: 50%; see Vossensteyn, 2004; Usher, 2005). This figure has consistently been much lower in the Netherlands, where the take-up rate is around 35% (Biermans et al. 2003; van den Broek and Van de Wiel 2005).

The low take-up rate is viewed as a problem in the Netherlands because students seem to work next to their study to avoid debt. Studies have found that on average Dutch students spend about 10 hours per week working in a job on the side (Biermans et al. 2003; van den Broek et al. 2006). This is not desirable from the government's perspective because it is likely to lead to an increased study length. Kalenkoski and Pabilonia (2008), Oettinger (2005), and

³⁸ Before 1992 government student loans were interest free. This was changed to prevent students making a

Stinebrickner and Stinebrickner (2003) provide evidence that work during college has detrimental effects on study performance. Indeed the Netherlands has a poor record in this respect, with an average study duration of 6 years (excluding drop-outs, CBS 2007) whereas the nominal duration of most higher education programs is 4 years. Since each student-year is heavily subsidized (Jongbloed et al. 2003), this is costly for the government.

To investigate the observed reluctance to borrow, the Dutch (vice-)minister of education called for research into students' attitudes and knowledge with respect to the loan scheme. A subsequent study found that, not only did students prefer working to supplement their income over borrowing, they also appeared to be only moderately informed about the loan scheme (van den Broek and Van de Wiel 2005). Moreover, students who were actually borrowing appeared to be better informed about the borrowing conditions than students who were not taking a loan. The same pattern was found in a similar study on borrowing of students in the UK (Callender 2003). The policy recommendation in the Dutch report, that increasing student awareness of the loan conditions may increase borrowing, was soon echoed by the minister (Ministry of Education 2006). However, it is not a priori clear that this association reflects the causal link implied by this recommendation. It may well be that taking a loan increases students' knowledge about the conditions but not vice versa.

5.3 Experimental design and empirical strategy

To isolate the causal impact of accurate knowledge about loan conditions on the loan take-up rate, we conducted a randomized experiment. A representative sample of Dutch higher education students were invited by E-mail to take part in two consecutive Internet surveys, with half a year in between (the first invitation did not announce the second questionnaire). The E-mail addresses were obtained from the Dutch agency that administers students' university enrollment, grants and loans. This agency also possesses respondents' background information on variables such as age, gender and Socio-Economic Status (SES).

The first questionnaire, sent out in February 2007, came in two versions. The entire sample of students received questions about their opinions concerning student loans and past borrowing. In addition, (a randomly assigned) half of the sample received factual

information about five loan conditions. This information was presented in the form of questions that asked respondents how favorable they thought each condition was. More specifically, these students were asked how favorable they perceived the following conditions:

1. The maximum loan amount during the grant period (which equals € 500)
2. The maximum loan period after the grant period (which equals 36 months)
3. The grace period (which equals 2 years)
4. The maximum length of the repay period (which equals 15 years)
5. The interest rate on student loans (which equals 3.7%)

The main reason to present the factual information in the form of questions was to give respondents a reason to read and think about the information. The respondents that received the version with the factual information about the loan conditions are in the treatment group, while the respondents that received the version without the factual information constitute the control group.

The follow-up survey, administered six months later in August 2007, asked the respondents to the first questionnaire again to fill in an Internet questionnaire. This questionnaire was identical for the treatment and control groups. Questions were asked about respondents' current study situation, their perceptions on job prospects, their attitudes towards borrowing, risk taking attitudes and the amount they borrowed in each of the months following the first survey.

Furthermore, questions were asked to measure respondents' knowledge about the loan conditions. In particular, they were asked what they thought were the true values of the five conditions about which the treatment group received information in the first questionnaire. It was stated explicitly that they should not search for this information on the Internet or elsewhere, stressing that giving a wrong answer would be without any consequence and that we were only interested in getting a picture of students' overall awareness about the loan conditions. We consider the fact that only a handful of respondents answered all five questions correctly (3 in the control group, 2 in the treatment group) as evidence that (almost) no one searched for the correct answers.

The intention behind this research design is that the random assignment of the information treatment generates exogenous variation in respondents' knowledge about the

loan conditions and that this variation can then be used to estimate the impact of more accurate knowledge of loan conditions on the loan take-up rate using an instrumental variable approach, where the treatment is used as an instrument for the accuracy of knowledge about the loan conditions.

The outcome variable of interest is a binary variable (denoted by y_i) that equals 1 if student i took a loan in the four months after the first survey, and 0 otherwise. This variable is related to characteristics such as family background, type of study, previous loan experience, and most importantly, the student's knowledge about the loan conditions. This last variable, written as K_i , is operationalized as the number of questions about loan conditions the student answered correctly in the follow-up survey. Imposing a linear relationship, we can write:

$$y_i = \alpha K_i + \mathbf{x}'_i \boldsymbol{\beta} + u_i \quad (5.3.1)$$

where \mathbf{x}_i collects control variables and u_i denotes an error term. The effect of interest is α . Estimation of this parameter using OLS will be biased if K_i is correlated with u_i , which would for instance be the case if students who are more interested in taking up a loan also collect more information, or acquire more knowledge because they borrow (in which case α picks up a reverse causality).

To estimate the causal impact of K_i on y_i we instrument K_i with the treatment dummy T_i , which equals 1 for students who were exposed to the information treatment and 0 for students who were assigned to the control group. To this end we estimate the following first stage equation:

$$K_i = \gamma T_i + \mathbf{x}'_i \boldsymbol{\delta} + \eta_i \quad (5.3.2)$$

where η_i is an error term. The idea here is that the treatment T_i creates variation in knowledge K_i that is independent of other factors that determine loan take-up. By looking only at the response in loan take-up with respect to this variation, the effect of knowledge on loan take-up can be estimated consistently. To do this, the reduced form equation

$$y_i = \tilde{\alpha} T_i + \mathbf{x}'_i \tilde{\boldsymbol{\beta}} + \tilde{u}_i \quad (5.3.3)$$

is estimated in the second stage. The instrumental variable estimator of the causal effect $\frac{\partial y}{\partial K}$

is then given by $\hat{\alpha} = \frac{\hat{\partial y}}{\hat{\partial K}} = \frac{\hat{\partial y}}{\hat{\partial T}} / \frac{\hat{\partial K}}{\hat{\partial T}} = \hat{\tilde{\alpha}} / \hat{\gamma}$.

The standard conditions that need to be fulfilled in order to use the treatment indicator T_i as an instrumental variable for knowledge K_i are: (i) that T_i has an impact on K_i ($\gamma \neq 0$), and (ii) that T_i is uncorrelated with u_i conditional on x_i . The first condition can be tested, and our first stage estimations of equation (5.3.2) show that it is indeed fulfilled. In general the second condition cannot be tested, but since the information treatment was assigned randomly, we can be confident that this condition also holds. To support this, the next section presents results showing that treatment status is uncorrelated with observable characteristics.

5.4 Data

A total of 3,812 students responded to the first questionnaire in which they were asked about their field and level of study, and about their attitudes towards borrowing (see section 5.7.2). About half of this sample ($N=1,914$) randomly received information about the properties of student loans provided by the government. All students that completed the first survey were contacted again for the follow-up survey (see section 5.7.3). The response rate for this second survey was 61%, which is comparable to other studies that target this sample, and quite reasonable considering that it was conducted at the end of the summer holiday. Response rates were virtually identical for the treatment and control groups (61% and 60% respectively). Hence, there is no indication of selective non-response with respect to treatment.

Table 5.1 reports descriptive statistics of the background variables that will be used as control variables. These descriptives are reported separately for the treatment and control groups. The important result in this table is that there are no significant differences between the groups for any of the variables. This indicates - as we claimed above - that the randomization worked.

Table 5.1: Descriptive Statistics

| | Controls | | Treated | | Difference | <i>p</i> -value |
|-----------------|----------|------|---------|------|------------|-----------------|
| | Mean | s.d. | Mean | s.d. | | |
| Female | 0.67 | 0.47 | 0.65 | 0.48 | -0.018 | 0.386 |
| Age | 21.07 | 1.81 | 21.04 | 1.72 | -0.031 | 0.684 |
| Ethnic minority | 0.05 | 0.21 | 0.04 | 0.20 | -0.004 | 0.653 |
| SES | 2.52 | 1.39 | 2.53 | 1.38 | 0.004 | 0.941 |
| Discount rate | 0.21 | 0.19 | 0.21 | 0.19 | -0.002 | 0.824 |
| Risk tolerance | 5.67 | 2.05 | 5.65 | 2.10 | -0.016 | 0.859 |
| Academic track | 0.60 | 0.49 | 0.62 | 0.49 | 0.014 | 0.508 |
| Loan experience | 0.30 | 0.46 | 0.30 | 0.46 | -0.004 | 0.838 |
| <i>N</i> | 1,090 | | 1,098 | | | |

Note: Mean values with standard deviations in parentheses. *p*-values are based on *t*-tests.

The mean values for age, social background and ethnicity are comparable to those in the population of higher education students. Two preference parameters that play a central role in economic models of investment decisions under uncertainty are risk aversion and the subjective discount rate. Risk aversion is measured by a subjective self evaluating measure of risk attitudes on a 1 to 10 scale that increases in risk tolerance (see Q25 on p.124). A series of hypothetical intertemporal choices pin down individuals' subjective discount rate (see Q26-Q31 on p.124). The students are, on average, moderately risk tolerant (6/10) and also moderately impatient (20%). These numbers are comparable with Dohmen et al. (2006) and Harrison et al. (2002), who find 5/10 and 28% for the German and Danish populations, respectively.

The variable "loan experience" indicates whether the student had taken up a student loan prior to the first survey. In both groups this fraction equals 30%, which is similar to what is reported in other studies (Biermans et al. 2003; van den Broek et al. 2006). Hence, the sample reflects the observation that loan take-up is low in the Netherlands compared to other western countries (Usher 2005).

As discussed above, we operationalized students' knowledge about the loan conditions by the number of questions the student answered correctly (Q14-Q19, p.123). To compare the answers to the true value, we rounded them to the unit which seemed to match the response scale for most respondents. The maximum loan amount (€ 500) for example was rounded to hundreds of euros, and the other questions were rounded to appropriate scales

in a similar way.³⁹ This rounding clarifies our graphical analyses (below) and does not affect the results since the correlation between the true and the rounded value is never below 0.99.

Table 5.2: Student characteristics, loan experience and loan knowledge (OLS)

| | Loan Experience | | Loan Knowledge | |
|------------------------|-----------------|---------|----------------|----------|
| | (1) | (2) | (1) | (2) |
| Female | 0.003 | (0.021) | -0.010 | (0.049) |
| Age | 0.040*** | (0.007) | 0.031* | (0.015)* |
| Ethnic minority | -0.006 | (0.047) | -0.113 | (0.101) |
| Socio-Economic Status | | | | |
| -Level2 | 0.026 | (0.025) | -0.047 | (0.059) |
| -Level3 | -0.034 | (0.031) | -0.058 | (0.079) |
| -Level4 | 0.072** | (0.033) | 0.009 | (0.077) |
| -Level5 | -0.004 | (0.032) | 0.078 | (0.077) |
| Academic track | 0.049** | (0.021) | 0.286*** | (0.049) |
| Study duration(months) | 0.011 | (0.011) | 0.123*** | (0.027) |
| Discount rate | 0.194*** | (0.054) | 0.145 | (0.126) |
| Risk tolerance | 0.016*** | (0.005) | 0.019* | (0.011) |
| Intercept | -0.710*** | (0.128) | -0.058 | (0.304) |

Note: Robust standard errors in parentheses. */**/** denote significance at a 10/5/1% confidence level.

To better understand which students make use of student loans, the first column of Table 5.2 presents estimates from a linear probability model where loan experience is regressed on student characteristics. There are no differences between boys and girls, and older students are more likely to borrow. Interestingly, students who are more at risk of being liquidity constrained, that is students with an ethnic minority background and students from lower socio-economic backgrounds, are not more likely to have taken out a student loan. One explanation is that the means tested component of the Dutch grant scheme adequately compensates students for their financial background. Finally, the most important determinants of loan experience seem to be students' discount rate and risk attitude.

It is also useful to consider how well different students are informed about the loan conditions. In the second column of Table 5.2 the number of correct answers on the five questions on loan conditions were regressed on the same student characteristics as in column (1). Students in the academic track are better informed, as are older and more

³⁹The maximum loan period after the grant period (36 months) was rounded to years, the maximum length of the repay period (15 years) was rounded to 5 years, and the interest rate (3.7 percent) was rounded to half a percentage point around the true value. The grace period was not rounded since all respondents answered in whole years.

experienced students. Risk averse students are also better informed. Again there is no relation between both socio-economic status and ethnicity, and loan knowledge.

Table 5.2 shows that the most important determinants of borrowing are students' discount rates and risk attitudes. There is no indication that liquidity constrained students are more likely to borrow. The results in the table suggest that this could be due to the fact that these students are not better informed about the loan conditions in the Netherlands than students from more favorable backgrounds, an explanation we will investigate in the next section.

5.5 Results

This section presents the empirical results of our experiment. It starts with reporting the impact of the information treatment on knowledge about loan conditions. It then presents results from OLS regressions of borrowing behavior on knowledge about loan-conditions, the (reduced form) effect of exposure to the information treatment on borrowing behavior, and finally the IV-estimates of the impact of more accurate knowledge about loan conditions on borrowing behavior.

5.5.1 *The impact of the information treatment on knowledge about loan conditions*

Before turning to our discussion of the impact of knowledge about loan conditions on loan take-up we need to assure that exposure to the information treatment has an impact on students' knowledge. The follow-up survey asked students about their knowledge about five loan conditions, and Table 5.3 reports for each condition the mean responses of the students in the treatment and control groups, and their differences.

Table 5.3: Mean responses to questions about loan conditions, by treatment status

| | Controls | | Treated | | Difference | <i>p</i> -value |
|-----------------|----------|-------|---------|-------|------------|-----------------|
| | Mean | s.d. | Mean | s.d. | | |
| Max loan | 422.8 | 213.6 | 448.2 | 210.8 | 25.4 | 0.005 |
| Max loan period | 21.2 | 19.4 | 23.3 | 18.8 | 2.1 | 0.012 |
| Grace period | 4.9 | 3.4 | 5.0 | 3.4 | 0.1 | 0.597 |
| Repay period | 14.5 | 10.5 | 13.8 | 7.5 | -0.7 | 0.057 |
| Interest rate | 2.6 | 1.8 | 2.7 | 1.8 | 0.1 | 0.083 |
| <i>N</i> | 1,090 | | 1,098 | | | |

Note: Mean values with standard deviations in parentheses. *p*-values are based on *t*-tests.

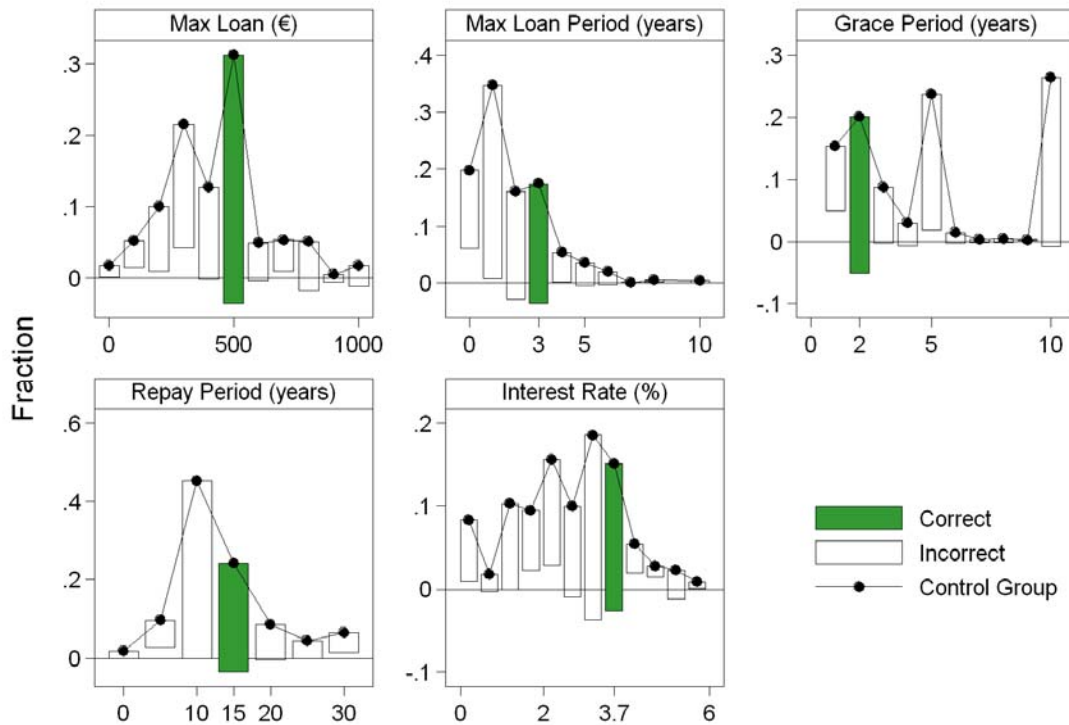
The results in column (1) show that Dutch higher education students (represented by the control group) are indeed poorly informed about the loan conditions. They underestimate the size of the maximum loan by over 75 euros (by more than 15%), underestimate the maximum loan period by over one year (by more than a third), overestimate the maximum grace period by almost 3 years (150%), underestimate the maximum repayment period by less than half a year (less than 4%), and underestimate the interest rate by more than 1 percentage point (almost 30%).

Notice that the poor information of students in the control group is not always in the direction of regarding the loan conditions as less generous than they actually are, as illustrated by the fact that students both overestimate the grace period and underestimate the interest rate.

Comparing the results in column (1) to those in column (2) shows that students who were exposed to the information treatment have on average more accurate knowledge about the size of the maximum loan, about the maximum loan period and about the interest rate than students in the control group. Students in the control group have, however, on average more accurate knowledge regarding the maximum grace period and the maximum repayment period. This mixed picture casts some doubt on the effectiveness of the information treatment.

Comparing the averages to the true values is misleading however, because that does not properly account for the full difference in the distribution. Figure 5.2 displays histograms of the perceptions of both the treated (vertical bars) and controls (connected points) for all conditions. The bars of the treated are “hanging” from the line spanned by the controls, such that the bars crossing the x-axis at zero indicate a higher concentration among the treated at that value.

Figure 5.2: Students' perceptions of loan conditions



Since the bars of the true values are shaded it is easy to see that there is a higher concentration of answers close to the correct value for the treated than the controls. For all conditions the treated bars are sticking out at the true value, meaning that the treated have better perceptions. This does not follow from the shifts in the averages because the distribution relocation is asymmetric around the true value. Hence it is possible for the average to move in the wrong direction while the fraction of informed people, the shaded column, increases.

The effects of the treatment on correctly answering the questions about the loan conditions are displayed in Table 5.4. For most conditions the treatment increases the group of correctly informed students by about 4 percentage points. The effect is strongest for the grace period (5.1%), and weakest for the interest rate (2.4%). Judging from Figure 5.2 however, it is clear that also for the latter condition the probability mass shifts to values closer to the true value. In total the controls answer on average 1.07 questions correctly, while the treated manage 1.26. Hence knowledge increases by about 18%, a moderate but significant change.

The information treatment has the strongest bearing on (total) knowledge. Effectively, all the variation in the treatment response of the different loan-conditions is collected by this measure, generating an F-statistic of 15.1. This number satisfies the rule of thumb of $F > 10$ that is often used to gauge the risk of small sample bias caused by a weak instrument (Staiger and Stock 1997). However, the (partial) explanatory power of the instrument, given by the partial R-squared measure equals 0.007, which is not very high. This will further inflate the IV standard errors compared to those of OLS. The precision of the estimates may be increased if we select a sub-group for which the instrument has more power (see, for example, Black et al. 2005). In particular, it seems likely that the effect of information will be smaller for students who have prior loan experience. These students have already encountered the loan scheme, and may thus be expected to have some knowledge about it. Hence, there may be less scope for improvement for this group of students. To investigate this, we break down the first stage by prior loan experience. The results are presented in the middle and bottom panels in Table 5.4.

Table 5.4: Effect of information on knowledge, all and by loan experience

| | | Maximum Loan | Maximum Loan Period | Grace Period | Maximum Repay Period | Interest Rate | Correct Answers |
|---|--------|-----------------|---------------------------|-----------------|----------------------------|------------------|--------------------|
| | | (1) | (2) | (3) | (4) | (5) | (6) |
| All (N=2,188) | Coef. | 0.034*** | 0.033** | 0.051*** | 0.037** | 0.023 | 0.177*** |
| | s.e. | (0.020) | (0.017) | (0.018) | (0.018) | (0.016) | (0.045) |
| | F-stat | 3.00 | 3.88 | 7.98 | 3.93 | 2.13 | 15.14 |
| Without loan experience (N=1,536) | Coef. | 0.037 | 0.046*** | 0.054*** | 0.043** | 0.026 | 0.206*** |
| | s.e. | (0.023) | (0.019) | (0.021) | (0.021) | (0.018) | (0.052) |
| | F-stat | 2.58 | 5.71 | 6.79 | 4.12 | 1.95 | 15.83 |
| With loan experience (N=652) | Coef. | 0.037 | 0.006 | 0.043 | 0.016 | 0.018 | 0.121 |
| | s.e. | (0.039) | (0.033) | (0.035) | (0.037) | (0.030) | (0.091) |
| | F-stat | 0.93 | 0.03 | 1.56 | 0.20 | 0.33 | 1.76 |

Each estimate comes from a separate regression that includes controls for age, gender, ethnicity, SES, discount rate, risk attitude, academic track, field of study and (in the top panel) loan experience. Robust standard errors in parentheses. */**/** denote significance at a 10/5/1% confidence level.

For the aggregate measure of “Correct answers”, the point estimate drops from 0.18 to 0.12 and turns insignificant for the group of students that have prior loan experience. The partial F-statistic is only 1.76. This is partly caused by the reduction in sample-size, but if we look at the explained variance we find the same: the power of the instrument is severely reduced, from 0.007 to 0.002, if the sample is restricted to students with prior loan experience. In

contrast, for the group of students without loan experience the point estimate is now 0.21 and the explanatory power increases to 0.01. Apparently, inexperienced students are particularly affected by the treatment, which is the group of students that would be specifically targeted by an information campaign and for whom we may hope for the largest effects. Hence, in what follows we will show a break down by loan experience.

5.5.2 *Borrowing behavior and knowledge about loan conditions*

Column (1) in Table 5.5 reports the OLS estimates of the relation between borrowing behavior and knowledge about the loan conditions for the full sample, and for the groups with and without prior loan experience. The coefficients of the covariates have been suppressed in this table, they are reported in the appendix to this chapter (section 5.7.1). In all three cases, we observe a substantial and significant relation. Each additional correct answer is associated with an increase in the probability that a student has a loan of 8 to 9 percentage points. This result reiterates the pattern observed in Figure 1. But as in Figure 1, this relation need not be causal.

Table 5.5: The effects of treatment and knowledge on borrowing behavior - OLS, Reduced Form (RF) and IV

| | OLS (1) | RF (2) | IV (3) |
|--------------------|---------------------|-------------------|-------------------|
| All | 0.086*** (0.008) | 0.004 (0.017) | 0.022 (0.092) |
| No Loan Experience | 0.081*** (0.010) | -0.015 (0.017) | -0.071 (0.089) |
| Loan Experience | 0.094*** (0.016) | 0.037 (0.038) | 0.309 (0.338) |

Note: Each estimate comes from a separate regression that includes controls for age, gender, ethnicity, SES, discount rate, risk attitude, academic track, field of study and (in the first three columns) loan experience. Robust standard errors in parentheses. */**/** denote significance at a 10/5/1% confidence level.

Exposure to the information treatment has a significant effect on knowledge, especially for the target group of students without loan experience. Whether exposure to the information treatment also translates into an increase in borrowing is displayed in column (2) in Table 5.5. For the whole sample the estimated effect is 0.004, and not significantly different from zero. Interestingly, there is a divide in the effect if we consider the break down by loan experience. The point estimate is negative for the inexperienced borrowers (-0.015) and

positive for those that have encountered loans before (0.037). This difference is not significant, but it suggests that the effect may even be negative for the target group.

The ratio of the reduced form and the first stage estimates gives the instrumental variable estimate of the causal effect of knowledge on borrowing behavior. The estimates are presented in column (3) in Table 5.5. For the whole sample the IV estimate equals 0.022, which is not significantly different from zero. Unfortunately, the standard error of 0.092 is so large that we can also not reject that the IV estimate is equal to the OLS estimate. For the group of students without prior loan experience the IV-estimate equals -0.071 which, with a standard error of 0.089, is not significantly different from zero. We reject equality of the OLS and IV-estimates; the IV-estimate is significantly below the OLS estimate (p -value = 0.042). For completeness the table also reports the IV-estimate for the group of students with prior loan experience, but since we have a weak instrument for this group the design is not informative here.

We have estimated the effect of being correctly informed about student loan conditions on their take up. Although our estimates are relatively imprecise they suggest that informing students about loan conditions may even lower take up rates. The explanation may lie in the fact that the treatment may result in positive or negative information updates. That is, the treatment may lead to more or less favorable perceptions of the actual loan conditions. The estimated effect of the treatment will therefore be an average of these two possibly offsetting effects which can explain the negative point estimates in Table 5.5.

5.6 Summary and discussion

The effectiveness of public policies is limited by the extent to which agents are correctly informed about them. Several studies document that students are poorly informed about the conditions of the government student loan scheme in the Netherlands. Students who are better informed have higher take-up rates. This suggests that governments can stimulate borrowing and thereby increase efficiency by providing more information about the - supposedly favorable - conditions of their loan schemes. This is actually what the Dutch government has recently been considering.

To investigate whether there really exists a causal impact of better knowledge about loan conditions on borrowing behavior, we conducted a randomized experiment where half of the participants were exposed to an information treatment. Six months later we find that

students who received information have better knowledge about the loan conditions. While for students with prior loan experience our treatment has no effect, for students without prior loan experience - which is the main target group of an information campaign - our design is informative.

Naive OLS estimates reveal a significantly positive association between knowledge about loan conditions and borrowing. This is consistent with the findings of earlier studies. Our instrumental variable estimates suggest, however, that there is no causal impact of better knowledge on borrowing, thereby indicating that information provision is an ineffective method to increase the loan take-up rate. Although this may imply that the loan scheme is effective in lifting liquidity constraints, the results of our experiment do not answer the question why Dutch higher education students have low take-up rates on study loans. They merely reject uninformedness about the favorable loan condition as a valid explanation. Although the results suggest that the information constraint is not binding, other constraints may be, and subsequent studies should therefore focus on alternative explanations for low take-up rates such as debt aversion or the low returns to studying hard. The results of such studies can only be satisfactory if they also explain why borrowing rates are lower in the Netherlands than elsewhere.

5.7 Appendix to chapter 5

5.7.1 Regressions with covariates reported

Table 5.6: OLS, Reduced Form (RF) and IV including regressors.

| | OLS (1) | RF (2) | IV (3) |
|-----------------------|---------------------|--------------------|--------------------|
| K | 0.086*** (10.17) | | 0.022 (0.24) |
| Treatment | | 0.004 (0.23) | |
| Female | 0.013 (0.71) | 0.012 (0.64) | 0.012 (0.66) |
| Age | 0.026*** (3.85) | 0.027*** (3.87) | 0.027*** (3.80) |
| Ethnic Minority | 0.10* (2.22) | 0.093* (1.97) | 0.095* (2.00) |
| Socio-Economic Status | | | |
| - Level 2 | -0.025 (1.21) | -0.030 (1.39) | -0.028 (1.32) |
| - Level 3 | 0.000 (0.03) | -0.004 (0.13) | -0.003 (0.09) |
| - Level 4 | 0.008 | 0.007 | 0.007 |

| | | | |
|------------------------|----------|----------|----------|
| | (0.28) | (0.23) | (0.25) |
| - Level 5 | -0.008 | -0.001 | -0.002 |
| | (0.29) | (0.02) | (0.08) |
| Discount rate | 0.18*** | 0.18*** | 0.18*** |
| | (3.73) | (3.77) | (3.75) |
| Risk tolerance | 0.021*** | 0.022*** | 0.022*** |
| | (5.35) | (5.55) | (5.26) |
| Academic track | 0.053** | 0.077*** | 0.071* |
| | (2.74) | (3.93) | (2.20) |
| Field of study | | | |
| - Natural sciences | -0.003 | 0.005 | 0.003 |
| | (0.09) | (0.13) | (0.08) |
| - Technical | 0.034 | 0.038 | 0.037 |
| | (1.01) | (1.09) | (1.08) |
| - Health | 0.067 | 0.069 | 0.069 |
| | (1.94) | (1.94) | (1.95) |
| - Economics | 0.026 | 0.038 | 0.035 |
| | (0.74) | (1.06) | (0.94) |
| - Law | 0.081 | 0.072 | 0.074 |
| | (1.73) | (1.48) | (1.53) |
| - Humanities | 0.014 | 0.021 | 0.019 |
| | (0.42) | (0.62) | (0.56) |
| - Language and culture | 0.071 | 0.081* | 0.078* |
| | (1.95) | (2.16) | (2.04) |
| - Education | 0.035 | 0.039 | 0.038 |
| | (0.79) | (0.84) | (0.83) |
| Study Duration | -0.000 | 0.000 | 0.000 |
| | (0.69) | (0.39) | (0.09) |
| Loan Experience | 0.36*** | 0.39*** | 0.38*** |
| | (16.71) | (17.82) | (11.12) |
| Intercept | -0.70*** | -0.69*** | -0.69*** |
| | (5.14) | (4.86) | (4.96) |
| N | 2188 | 2188 | 2188 |

Note: Regressions on full sample. Robust standard errors in parentheses. */**/** denote significance at a 10/5/1% confidence level.

5.7.2 Survey February 2007

Welcome to this short survey concerning student loans. Completing the questionnaire will only take a couple of minutes. One of the respondents of the survey will win an iPod Nano! You will be notified whether you are the winner directly after completing the questionnaire. The name of the winner will also be published on the www.HetStudentenpanel.nl website.

- 1 Do you still follow higher education?
 - yes, at an academic university
 - yes, at a higher vocational school
 - no, mean while I have obtained my degree <go to Q17>
 - no, I have quit studying prematurely <go to Q17>

- 2 What phase of studying are you in?
 - begin phase
 - middle phase
 - end phase

- 3 *Does the IB-Groep [student financial aid organization] currently supply you with: (multiple answers possible)*
- basic grant
 - supplementary grant
 - interest bearing loan
 - no, I don't receive any of these types of student financial aid
- 4 *Did you in the passed (also) receive a student loan from the IB-Groep?*
- yes
 - no <treated go to Q6; controls go to Q12>
- 5 *For how many months have you taken-up a student loan with the IB-Groep during your (current) studies? <only if Q3=3 or Q4=1> <open question:months>*

Controls go to Q12.

<Randomized questions on separate pages>

Students that receive a basic grant can (depending on the size of their supplementary grant) borrow a maximum of € 500 per month. Students who do not receive a basic grant can, for another 36 months, borrow a total of € 790 per month.

- 6 *Do you think this is an attractive property?*
- yes
 - no
 - neutral/no opinion

You can borrow while you receive a basic and/or a supplementary grant (the nominal study period): the normal period of your curriculum. When your eligibility for a basic grant ends you can take up a loan for another 36 months.

- 7 *Do you think this is an attractive property?*
- yes
 - no
 - neutral/no opinion

Students start repaying their debt on the first of January two years after they have quit or finished their studies (grace period). It is also possible to start repaying earlier.

- 8 *Do you think this is an attractive property?*
- yes
 - no
 - neutral/no opinion

You have to repay the debt in fixed monthly installments within 15 years. You do not have to pay the full monthly installment in case you have insufficient income in a particular year. After 15 years, any remaining debt will be forgiven.

- 9 *Do you think this is an attractive property?*
- yes
 - no
 - neutral/no opinion

The interest levied on the student loan is 3.7 in 2007. For comparison: a normal savings account will give you roughly the same return or more.

- 10 *Do you think this is an attractive property?*

- yes
- no
- neutral/no opinion

You can choose the loan amount yourself. Temporary financial hardship? You can flexibly take a loan for two months and stop borrowing when it is no longer necessary.

- 11 *Do you think this is an attractive property?*
- yes
 - no
 - neutral/no opinion
- 12 *Which statement comes to your mind first when thinking of student loans?*
- a I first think of:
- Necessary evil
 - Gives the possibility to completely focus on studying
- b I first think of:
- Later I will earn enough to repay the debt.
 - I am afraid of having a large debt.
- c I first think of:
- Borrowing stresses the individual responsibility for studying.
 - I think borrowing is a risk
- d I first think of:
- Favorable conditions
 - Unfavorable conditions
- e I first think of:
- Study faster and start working
 - Afford extra luxury
- f I first think of
- Borrowing is better than working
 - Working is better than borrowing
- g I first think of
- Borrow more > work less > more spare time
 - Borrow more > work less > study more
- h I first think of
- Loans are a blessing
 - Loans are a curse
- i I first think of
- I feel guilty if I borrow in stead of taking a job
 - I can work the rest of my live.
- j I first think of:
- Borrowing is *not done* if it is nor necessary
 - Borrowing makes life more pleasurable
- k I first think of:
- The high rate of interest makes borrowing unattractive

- The low rate of interest makes borrowing attractive
- 1 I first think of:
- I would rather eat dry bread than take a loan.
- Eat and drink well.
- 13 *What is your attitude towards borrowing for your studies?*
- very negative
- predominantly negative
- mildly negative
- neutral
- mildly positive
- predominantly positive
- very positive
- 14 *What is your parents' opinion about student borrowing?*
- very negative
- predominantly negative
- mildly negative
- neutral
- mildly positive
- predominantly positive
- very positive
- not applicable / I don't know

This was the final question of the survey. Click on the button below to send it. Thank you very much for your cooperation.

5.7.3 *Survey August 2007*

Dear student. In February of this year you participated in an internet survey about student borrowing behavior. This survey is used to investigate attitudes towards borrowing by students. This research is conducted by ResearchNed from Nijmegen and the University of Amsterdam commissioned by the Ministry of Education, Culture and Sciences. At the end of this survey we will ask you about your study progress and your financial situation. You can also answer to the questionnaire if you have quit or finished studying. If you complete this second survey, you have a chance to win one out of five iPod MP3 players with 4GB!

- 1 *Do you still follow higher education? <single response>*
- yes, at an academic university
- yes, at a higher vocational school
- no, meanwhile I have obtained my degree <go to Q3>
- no, I have quit studying prematurely <go to Q5>
- 2 *For how many months have you been studying? <number 1-120>*
-months
- 3 *When did you finish your studies? (we do not mean the date of the graduation ceremony, but we mean the formal completion date.)?*
-monthsyear
- 4 *How many months did you need to complete your studies? < number 1-120> <go to Q8>*
-months

- 5 *When did you quit studying?*
monthsyear
- 6 *After how many months did you quit studying (counted from the exact date you started)? <number 1-120> <go to Q8>*
months
- 7 *Does the IB-Groep currently provide you a : <multiple response><if Q1=1 or 2>*
- basic grant
 - supplementary grant
 - interest bearing loan
 - no, I don't receive any of these types of student financial aid
- 8 *Have you ever taken out a student loan from the IB-Groep in the past? <single response><all>*
- yes
 - no
- 9 *Have you taken out a student loan with the IB-Groep in the past four months and if so, what was the amount of the loan? <all>*
- a In April I borrowed:
- €
 - I did not borrow
- b In May I borrowed:
- €
 - I did not borrow
- c In June I borrowed:
- €
 - I did not borrow
- d In July I borrowed:
- €
 - I did not borrow
- 10 *How many credit points did you obtain in the past few months? <all>*
- | | | | |
|---|-------|-----------|-------------------------------|
| a | April |ECTS | <input type="checkbox"/> n.a. |
| b | May |ECTS | <input type="checkbox"/> n.a. |
| c | June |ECTS | <input type="checkbox"/> n.a. |
| d | July |ECTS | <input type="checkbox"/> n.a. |
- 11 *How many credit points did you obtain in total in the last academic year? <all>*
- 12 *Next to your study how many hours did you, on average, work per week the past months (paid labor)?*
- | | | | |
|---|-------|------------------------------|-------------------------------|
| a | April | average hours per week | <input type="checkbox"/> n.a. |
| b | May | average hours per week | <input type="checkbox"/> n.a. |
| c | June | average hours per week | <input type="checkbox"/> n.a. |
| d | July | average hours per week | <input type="checkbox"/> n.a. |
- 13 *Are you planning to borrow from the IB-Groep in August? <if Q1=1 or 2>*
- yes: how much: €
 - no

The next questions concern your familiarity with the conditions of student loans. You do not have to give the correct answers to these questions. Our only interest is how familiar you are with the conditions of student loans.

- 14 What is the maximum amount that you can borrow from the IB-Groep while you receive a basic grant?
.....Euro
- 15 For how many months can you take out a student loan with the IB-Groep after you are no longer eligible for a the basic?
.....months
- 16 How many months after finishing your study do you, at the latest, have to start repaying your debt with the IB-Groep?
.....years
- 17 In how many years do you have to payoff your debt?
.....years
- 18 What is the interest rate on student loans?
.....percent <1 decimal>
- 19 What is your attitude towards borrowing to finance your studies? <single response>
- very negative
 - predominantly negative
 - mildly negative
 - neutral
 - mildly positive
 - predominantly positive
 - very positive
- 20 What is the attitude of your parents about borrowing to finance your studies? <single response>
- very negative
 - predominantly negative
 - mildly negative
 - neutral
 - mildly positive
 - predominantly positive
 - very positive
 - not applicable / I don't know
- 21 Do you think you will attain the diploma of your current curriculum.? <single response> <if Q1=1 or 2>
- I don not think so
 - probably will not
 - probably will
 - I am sure
- 22 Say you finish your current studies. How likely do you think it is that you find a job that corresponds to your education?
<single response> <if Q1=1 or 2>
- I don not think so
 - probably will not
 - probably will
 - I am sure
- 23 What net monthly income do you think you will earn 2 years after you have graduated? <single response> <if Q1=1, 2 or 3>
- less than € 1000

- approximately € 1000
- approximately € 1250
- approximately € 1500
- approximately € 1750
- approximately € 2000
- approximately € 2250
- approximately € 2500
- approximately € 2750
- approximately € 3000
- approximately € 3250
- approximately € 3500
- approximately € 3750
- approximately € 4000
- more than € 4000

24 *What net monthly income do you think you will earn 5 years after you have graduated?* <single response> <if Q1=1, 2 or 3>

- less than € 1000
- approximately € 1000
- approximately € 1250
- approximately € 1500
- approximately € 1750
- approximately € 2000
- approximately € 2250
- approximately € 2500
- approximately € 2750
- approximately € 3000
- approximately € 3250
- approximately € 3500
- approximately € 3750
- approximately € 4000
- more than € 4000

25 *How do you judge yourself: Are you in general prepared to take risks, or do you try to avoid risks? Evaluate yourself on a left to right scale, where the box on the far left means 'not prepared to take risks' and the box on the far right means 'prepared to take risks'.* <single response><all>

prepared to take risks not prepared to take risks

26 *Say you have to choose between receiving € 1.000 today or € 1.050 in one year. Which of these two options would you prefer?* <single response><all>

- prefer € 1.000 today
- prefer € 1.050 in one year

27 *Say you have to choose between receiving € 1.000 today or € 1.100 in one year. Which of these two options would you prefer?* <single response><all>

- prefer € 1.000 today
- prefer € 1.100 in one year

28 *Say you have to choose between receiving € 1.000 today or € 1.200 in one year. Which of these two options would you prefer?* <single response><all>

- prefer € 1.000 today
- prefer € 1.200 in one year

29 *Say you have to choose between receiving € 1.000 today or € 1.300 in one year. Which of these two options would you prefer?* <single response><all>

- prefer € 1.000 today
 prefer € 1.300 in one year
- 30 *Say you have to choose between receiving € 1.000 today or € 1.400 in one year. Which of these two options would you prefer? <single response><all>*
- prefer € 1.000 today
 prefer € 1.400 in one year
- 31 *Say you have to choose between receiving € 1.000 today or € 1.500 in one year. Which of these two options would you prefer? <single response><all>*
- prefer € 1.000 today
 prefer € 1.500 in one year
- 32 *Finally we would like to ask you by how far the below statements apply to you. <grid 1-5: does not apply to me at all – applies to me very well: randomized><all>*
- a I have purposefully chosen to follow higher education because I want to, in the future, be able to help others.
- b By following a higher education I will be able to contribute more to society.
- c Studying enables me to help others.
- d If you get the opportunity to follow higher education, I think it is important to reciprocate to society/others.
- e In my future employment I think it is more important to do something useful for society than to earn a high salary.
- f I have consciously chosen to follow higher education because of passion of my subject
- g To me, studying means acquiring knowledge and insight into the subject that interest me and that I would like to put into practice in my future career.
- h I have been interested in this subject from when I was young. To continue higher education in this field of subject is a logical step.
- i I also spend much time on my subject of interest outside of the curriculum.
- j Continuing in higher education is important because it creates an opportunity to develop more broadly.
- k Following higher education is a goal in itself.
- l I study to develop myself.
- m To expand myself is my main motivation to follow higher education. The professional perspective plays a minor role.
- n Studying is a necessary evil.
- o The main reason I went on to do higher education is that it was expected of me.
- p I am looking forward to finish studying.
- q I want my studies to take as little from my free time as possible.
- r I have consciously chosen an education that gives me a well paid job.
- s Higher education will provide me with a job with status.
- t It is important to me that my subject topic is in high regard.
- 33 *How would you describe your financial situation in the past four months (March - June)? <all>*
- very bad
 bad
 reasonable
 good
 very good
- 34 *How would you describe your current financial situation? <all>*
- Very bad
 bad
 reasonable
 good
 very good

This was the last question of the survey. You can press the button below to send it. Thank you very much for your cooperation! You will be notified if you have won the iPod nano after the survey research is completed (in September). The winners will be made public on the website www.studentenpanel.nl.