



An empirical analysis of borrowing behaviour of higher education students in the Netherlands

Hessel Oosterbeek^{a,*}, Anja van den Broek^b

^a Universiteit van Amsterdam, School of Economics, Roetersstraat 11, 1018 WB Amsterdam, The Netherlands

^b ResearchNed, Postbus 31162, 6503 CD Nijmegen, The Netherlands

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ABSTRACT

Many higher education students combine their study with a job on the side instead of taking up a loan. This paper examines the factors underlying this apparently myopic behaviour. We find that standard economic factors explain observed borrowing decisions to some extent. Students with easier access to financial resources borrow less often. Students with good earnings prospects and/or a high discount rate borrow more often, as do students who are prepared to take risks. An important non-standard factor affecting borrowing choices is debt aversion. We also find that a reduction in working hours will only have a limited positive impact on the time spend on studying.

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1. Introduction

While the nominal duration of most higher education programmes in the Netherlands is equal to 4 years, the average actual study duration is equal to almost 6 years. This deviation between nominal and actual duration is not caused by the fact that the programmes are too demanding. Instead, various studies examining study behaviour of Dutch higher education students reveal that many students spend no more than 25–30 h per week on their study. Most of these students also attribute a substantial share of their time to a paid job. Studying is thus often treated as a part-time activity.

In light of the high financial returns to higher education (cf. Webbink, 2007) such study behaviour seems myopic. The net discounted value of lifetime earnings could easily be boosted, so it seems, if students would study full-time

and finish their study in the nominal duration. The earnings they currently receive from their part-time jobs could be replaced by taking up loans that the Dutch government has available for this purpose.

The Dutch ministry of education regards the current situation with many students *de facto* studying part-time, as sub-optimal and wants to encourage higher education students to study faster and, if necessary, to take up more and/or larger loans. In order to decide how the current financial aid scheme (with a mixture of basic grants, grants depending on parents' income and mortgage type loans) should be reformed to reach this goal, it is useful to know which factors determine why so many students do not take up loans to finance their study.

This paper addresses this issue. Using data from a questionnaire that was recently conducted among over 6000 higher education students in the Netherlands, we attempt to shed more light on the factors driving students' borrowing decisions. We start with examining several explanations suggested by standard economic theory. These factors include uncertainty with regard to success-

* Corresponding author. Tel.: +31 20 5254242.

E-mail address: h.oosterbeek@uva.nl (H. Oosterbeek).

ful completion of the current study and finding a suitable job, risk aversion and time preferences. While these factors affect the decision to borrow in the predicted directions, their explanatory power is limited. Even students who are certain about study completion and job prospects, who are prepared to take risks and who have sufficiently high discount rates, have a low probability to borrow.

We then turn to debt aversion as an alternative explanation. Behavioural economists have proposed this as an explanation for observed borrowing patterns (Loewenstein & Thaler, 1989). We examine this explanation for low take-up rates of loans, and find support for this.

The remainder of this paper is organized as follows. Section 2 reviews related literature on borrowing by students and their attitudes towards debt. Section 3 describes the data; how they have been collected, how representative they are and which variables are included. Section 4 presents and discusses the empirical findings. Section 5 summarizes and concludes, and discusses the policy implications of our findings.

2. Related studies

While economists have addressed the importance of liquidity constraints for educational choices (cf. Cameron & Taber, 2004; Shea, 2000),¹ actual borrowing behaviour among students and students' attitudes towards borrowing is a relatively unexplored area.

An early study about students' attitudes towards debt is Davies and Lea (1995). Using data from a questionnaire among 140 undergraduate students at the University of Exeter, they attempt to shed light on the relations between students' attitudes towards debt, their actual debt and background characteristics like gender, age and religion as well as expenditures on various categories (food, clothing, entertainment and other) and psychological measures as locus of control and stressful life events. The authors' main concern is to identify whether measured debt attitudes affect having debt, or whether having debt induces a change in attitudes towards debt. (Psychologists believe that in many cases attitudes are adjusted to be aligned with behaviour rather than that actual behaviour follows attitudes.)

To address this issue they exploit that respondents are from three different study years (1–3). What they observe is that the second years students in their sample report substantially higher average debts than the first year students in their sample. At the same time, debt attitudes for these two groups are fairly similar. In contrast, third year students are less averse to debt than second year students (and their average debt is also higher).

This leads the authors to conclude that a change in debt position precedes a change in debt attitudes and thus that attitudes are changed such that they are aligned with actual

behaviour. A problem with this interpretation is that first, second and third years students need not be comparable due to selective dropouts. The first year sample also includes students who will never be observed as second year students because they will dropout. Non-borrowing students are, other things equal, more likely to dropout because they may have a part-time job to finance their study and because they have less reason to complete their study (because they have no debt to repay). Notice furthermore that sample sizes are extremely small especially when looking at separate cohorts of students.

Eckel, Johnson, Montmarquette, and Rojas (in press) estimated the effect of debt aversion on individuals' willingness to take up a loan for education purposes using experimental methods. More precisely they confronted nearly 900 Canadian residents with 30 different choices between two options. All 30 choices were between a cash alternative (in most cases \$100) and an education funding alternative. These education funding alternatives included grants (ranging from \$300 to \$1000), loans (\$1000 and \$2000), income contingent loans (same amounts) and matching grants (ranging from 20% to 200%). One of the 30 choices was randomly selected and actually paid. Individuals were also asked questions regarding their risk aversion, time preference and attitudes towards debt. The authors use the information thus collected to regress the take up of education subsidies (grant or loan vs. the cash alternative) on characteristics of the education subsidy and individuals' characteristics (including attitudes).

The results indicate that individuals who are more risk seeking are more likely to opt for education subsidies (instead of cash alternatives). The same is true for patient individuals. The authors also find that individuals with high scores on the debt aversion questions are *not* more or less likely than others to choose an education subsidy involving a loan. Another interesting finding is that individuals who carry heavy debt loads are more likely to take up subsidies in the form of a loan. The authors interpret both findings as evidence that debt aversion is not a barrier to investing in higher education. If we, however, interpret not carrying heavy debt loads as an alternative measure for debt aversion, we would conclude the contrary. Related to this, it seems that "having debts" and "hating debts" are highly correlated. It may therefore very well be that the finding on "hating debt" reverses once "having debt" is not included in the regressions.

Finally, in a recent study Field (2006) reports about a field experiment in which law students at NYU were randomly assigned to one of two financial aid conditions. The first, standard, condition is a loan repayment assistance program (LRAP) which forgives all graduates who choose careers in the public sector or other low paying fields of law the majority of educational loans incurred during law school through quarterly prospective funding for up to 10 years following graduation. The second, innovative, condition consist of public service scholarships (PSS) that provide grants of two-thirds tuition that converted to a loan in the event that a recipient did not pursue a public interest law career. The two schemes are identical in terms of their financial consequences, and differ only in the duration of indebtedness. Under the LRAP scheme people have a debt

¹ Inferring the importance of borrowing constraints from predictions regarding the different roles of foregone earnings and direct costs of education Cameron and Taber find no evidence that educational choices in the US are restricted due to borrowing constraints. Shea's finding that variation in parents' income that is due to luck factors has no impact on children's human capital concurs with this.

position right from the start, under the PSS scheme people only carry a debt burden when they do not pursue a public interest law career. Field's results show differences in outcomes between the two treatments. In classes for which the lottery was announced prior to enrolment, those in the PSS treatment are twice as likely to enrol. Moreover, those in the PSS treatment are also substantially more likely to have a first job in public interest law. Field interprets her findings as evidence of debt aversion: behaviour is consistent with utility being negatively affected by carrying debt loads.

3. Data

The data for this study were collected by sending an email inviting 10,955 members of a panel of higher education students known as "Het Studentenpanel" to fill out a questionnaire posted at the Internet. 6878 of them logged in and 6103 successfully completed the questionnaire. Because respondents had to fill in a login code, their responses could be merged with background information that was already available from an earlier intake. Women and university students are clearly overrepresented among the respondents. To address that, all results reported in this paper are obtained using sample weights.

The questionnaire consisted of questions that are all directly or indirectly related to students' borrowing behaviour. This gives information about: the types of financial support students receive (including whether they take up a loan), the stated reasons for (not) borrowing, whether they hold a part-time job and if so, how many hours they spend on it, study hours, how well informed they are about details of the government's loan scheme, respondents' attitudes towards borrowing as well as borrowing attitudes of their parents, how certain respondents are with regard to study completion and finding a suitable job, their earnings expectations, risk attitudes and time preferences.

Some of the important explanatory variables in this paper are measured through subjective survey data. Using such data is controversial among mainstream economists. Bertrand and Mullainathan (2001) discuss some of the problems with the use of such variables. Respondents may suffer from cognitive problems. Evidence of this is that the ordering of questions, the exact wording and the precise measurement scales can have substantial effects on the responses. Furthermore, respondents may tailor their answers to what they think is socially desirable. Finally, it is sometimes unclear whether the attitudes researchers are trying to measure really exist in a coherent form.

Bertrand and Mullainathan (2001) discuss how these problems may bias the empirical analysis from a measurement-error perspective. When the subjective variables are explanatory variables (as in our case), some of the problems mentioned above translate into white noise. This will produce attenuation bias, meaning an underestimate of the true effect. Other problems translate into survey fixed effects. As long as appropriate controls for year and survey specific dummies are included, this will not bias the results. The most troublesome form of measurement error occurs when misclassification is correlated with unobservables that have an independent impact on the dependent

variable. This will in general bias the results and this has to be taken into account when interpreting the estimation results.

The background information includes among others: age, sex, parents' income, and indicators of respondents' cognitive ability when they were age 12. These ability indicators are the school advice given to the respondents at the end of primary school and the score on a nationwide achievement test. For a substantial fraction of the respondents, these ability measures are unavailable. When we include these measures in the empirical analyses, we impute modal and mean values for missing values and create additional dummies for these imputations.

Table 1 presents descriptive statistics for the variables that we use in the empirical analyses, separately for students who report that they currently borrow or did so in the past and for students who have not taken up a loan until the moment of the interview.²

The final row of the table indicates that 1973 out of 5621 respondents (35%) are currently taking up a study loan or have done so in the past. The share of 35% is consistent with what has been found in other Dutch studies (Biermans, De Graaf, De Jong, Van Leeuwen, & Van der Veen, 2003; van den Broek & Van de Wiel, 2005).³

The figures in Table 1 point to the following differences between borrowing and non-borrowing students. A smaller fraction of borrowers is female and borrowers are on average almost 1.5 year older than non-borrowers. University students are more likely to borrow than students attending professional schools. Average income of parents is higher among non-borrowers than among borrowers. Borrowers give themselves a higher probability to complete their studies than non-borrowers. Borrowers have higher levels of risk attitudes than non-borrowers meaning that they are more willing to take risks. The discount rate of future incomes is higher among borrowers than among non-borrowers.⁴ Borrowers are less debt averse than non-borrowers; this is also true for borrowers' parents. Borrowers are somewhat less likely to have a part-time job and they spend 36 min per week more on their study.

The part-time jobs that students hold are typically low skilled jobs. 83% of the respondents with a part-time job indicate that it requires less than their current level of education; 34% even indicates that their part-time job does not require more than primary education. Moreover, 74% of the respondents with a part-time job say that their job is unrelated to their field of study.

While borrowing students are less debt averse than non-borrowing students, these two variables are certainly not

² Appendix A to this paper describes which questions have been asked to measure some of the variables used in the analyses.

³ The studies by Biermans et al. (2003) and van den Broek and Van de Wiel (2005) define students as borrowers when they are currently taking out a loan. Given that in the Dutch loans system students can change their borrowing status from month to month, this is a somewhat arbitrary definition, because it is unclear what "currently" means.

⁴ The average values of the discount rate and the risk attitude measure in the sample are in line with values reported elsewhere (cf. Frederick et al., 2002 and Dohmen et al., 2005, respectively).

Table 1
Descriptive statistics by borrowing status

| Variable | Scale | Borrow = 0 | | Borrow = 1 | | p-value ^a |
|-----------------------------------|-----------------|------------|------|------------|-------|----------------------|
| | | Mean | S.D. | Mean | S.D. | |
| Female | 0/1 dummy | 0.74 | 0.44 | 0.66 | 0.47 | 0.000 |
| Age | Years | 21.44 | 2.12 | 22.85 | 2.59 | 0.000 |
| Age missing | 0/1 dummy | 0.16 | 0.37 | 0.10 | 0.30 | 0.000 |
| Test score at age 12 | 500–550 | 544.42 | 4.30 | 544.48 | 4.31 | 0.611 |
| Test score missing | 0/1 dummy | 0.53 | 0.50 | 0.54 | 0.50 | 0.472 |
| School advice | 1–5 | 4.43 | 0.98 | 4.44 | 0.97 | 0.866 |
| School advice missing | 0/1 dummy | 0.17 | 0.38 | 0.11 | 0.32 | 0.000 |
| University | 0/1 dummy | 0.52 | 0.50 | 0.65 | 0.48 | 0.000 |
| Income parents | 1–6 | 3.86 | 1.28 | 3.66 | 1.38 | 0.000 |
| Income parents missing | 0/1 dummy | 0.16 | 0.37 | 0.10 | 0.30 | 0.000 |
| Probability to complete study | 1–4 | 3.64 | 0.55 | 3.71 | 0.53 | 0.000 |
| Probability to find suitable job | 1–4 | 3.31 | 0.60 | 3.28 | 0.65 | 0.379 |
| Earnings 2 years after graduation | Log euros/month | 7.60 | 0.57 | 7.60 | 0.64 | 0.640 |
| Earnings 5 years after graduation | Log euros/month | 7.66 | 1.06 | 7.64 | 1.13 | 0.575 |
| Risk attitude | 1–10 | 6.17 | 2.04 | 6.64 | 2.09 | 0.000 |
| Discount rate | 0.10–0.60 | 0.23 | 0.17 | 0.29 | 0.18 | 0.000 |
| Debt aversion | 1–4 | 2.86 | 0.73 | 2.24 | 0.76 | 0.000 |
| Debt aversion parents | 1–4 | 3.00 | 0.75 | 2.32 | 0.88 | 0.000 |
| Debt aversion parents missing | 0/1 dummy | 0.17 | 0.37 | 0.12 | 0.32 | 0.000 |
| Holds part-time job | 0/1 dummy | 0.77 | 0.42 | 0.75 | 0.43 | 0.057 |
| Working hours | Hours per week | 7.56 | 6.63 | 7.87 | 7.32 | 0.100 |
| Study hours | Hours per week | 27.42 | 9.52 | 28.01 | 10.00 | 0.029 |
| No observations | | 3648 | | 1973 | | |

^a p-values of test for difference between borrowers and non-borrowers.

perfectly correlated. Over one third of the non-borrowers have a low debt aversion score of 1 or 2 (on a scale from 1 to 4), and almost one third of the borrowers have a high debt aversion score of 3 or 4.

A possible concern is that the subjective scores on debt aversion, risk attitude and discount rate are all measuring the same underlying unobserved characteristic. It is therefore reassuring that the correlations between each pair of these variables are fairly low: 0.11 between risk attitude and discount rate, -0.11 between risk attitude and debt aversion and -0.04 between debt aversion and discount rate.

The above relations are all bivariate and do therefore not control for correlations with other variables. It might for instance be the case that the observed positive correlation between the perceived probability to complete the study and borrowing vanishes once we control for age (older students borrow more and are closer to completion of their study). Likewise the zero correlation between test score results and borrowing may change once we control for the level of study (university vs. professional school). The next section presents results from multivariate analyses to address such issues.

4. Empirical results

In a standard economic model without uncertainty, individuals borrow and save to smooth their expenditures over time. The amount that they borrow/save in a certain period will then depend on current income, current wage rate, future income, the interest rate and the subjective discount rate (a parameter of the utility function). When uncertainty is added to the model, the borrowing/saving decision will also be influenced by the perceived amount of

uncertainty and individuals' risk attitudes. This framework does not fundamentally change when the decision-makers are students and the expenditures are partially an investment.

The standard model without uncertainty therefore suggests an empirical specification where the borrowing decision is regressed on the following explanatory variables:

- parents' income (as proxy for current income)
- (expected) future earnings
- subjective discount rate⁵
- age (as indicator of how close an individual is to study completion)⁶
- level of higher education, ability and gender (as additional indicators of expected future earnings and/or as taste shifters)

Predictions of standard theory are that parents' income has a negative effect on the probability to borrow and that all other explanatory variables affect the probability to borrow positively.

The model with uncertainty should also include the following regressors:

- probability to complete study
- probability to find a suitable job
- risk attitudes

⁵ The interest rate does not appear in the list of explanatory variables because its value does not vary across respondents. The effect of this variable will therefore be absorbed by the constant term.

⁶ Notice that other measures of closeness to study completion may depend on past borrowing decisions.

Here the prediction is that all three variables have a positive impact on the probability to borrow (recall that higher values of the risk attitude measure represent less risk aversion).

Different approaches support different ways to include debt aversion in the analyses. Debt aversion does not appear in the standard model (with or without uncertainty). Behavioural economics models suggest that individuals attach a negative value to a debt position over and above its negative monetary value (cf. Field, 2006; Loewenstein & Thaler, 1989). If different individuals have different degrees of such debt aversion it is a parameter in the utility function, and can therefore be included in the regressions as an explanatory variable.

Psychologists instead would advocate a model in which both debt aversion and borrowing decisions are endogenous variables, and where both could in principle affect each other. This is clearly the most general model and nests the behavioural economics model (which in turn nests the standard models). Identification of this psychological model, however, is very demanding and not feasible with the data at hand (nor with any other data set we know). To be more precise: the psychological model allows debt attitudes to influence borrowing behaviour and vice versa. To identify such a model requires that there is at least one variable that has an impact on debt attitudes but has no direct impact on borrowing behaviour and that there is one variable that has an impact on borrowing behaviour without having a direct effect on debt attitudes. Even if availability of data would not be a restriction, we find it hard to come up with two variables that meet these requirements.

We will therefore estimate three model versions: the standard economic model without uncertainty, the standard economic model with uncertainty and the behavioural economics model in which the standard model with uncertainty is supplemented with debt aversion.

The first column in Table 2 presents the results for the standard model without uncertainty. The estimates are coefficients from a linear probability model and can directly be interpreted as marginal effects.⁷

Parents' income has the expected negative effect on borrowing; children from more affluent families receive more financial support from their parents and are therefore less inclined to take up a loan. This effect is substantial; if parents' income is above the modal income of 2200 euros per month, students are around 5–10 percentage points less likely to borrow than if parents' income does not exceed the modal income.

The levels of expected future earnings 2 or 5 years after completion of the study appear to have no impact on borrowing choices. Other indicators of future earnings, however, do affect borrowing choices in the theoretically predicted direction. That is: university students who on average have better earnings prospects than students from professional schools, are other (observed) things equal more likely to borrow. Also, female students who on average face lower earnings prospects than their male

counterparts and who also are more likely to experience dips in their future earnings due to labour market interruptions, are somewhat less likely to borrow. Finally, more able students – as indicated by their school advice and/or test score – tend to be a bit more likely to borrow than others. The gender and ability effects are, however, not statistically significant at conventional levels.

The third factor included in the standard model is the discount rate and this also has the sign predicted by standard theory. A higher subjective discount rate points to a higher valuation of current consumption relative to future consumption and is thus consistent with a higher take-up rate of loans. The minimum value of the discount rate in the sample is 0.10 and the maximum value equals 0.60 (see Appendix A). The coefficient is such that persons with the highest discount rate are about 17 percentage points more likely to borrow than persons with the lowest discount rate. An increase of the discount rate with one standard deviation increases the borrowing rate with about 5 percentage points.

Age has the expected positive sign, students who are closer to study completion and who will therefore carry their debts for a shorter period because they start to repay sooner, are more likely to borrow. Being a year older increases the probability of borrowing by 5 percentage points.

The second column extends the standard model with variables related to uncertainty. The coefficient of the subjective probability to complete the current study has the predicted positive sign (being less uncertain about the future should increase the borrowing rate), but it is small and statistically insignificant. The probability to find a suitable job, however, has the opposite sign; but this coefficient also lacks precision.

Students' attitudes towards risk have the expected positive sign; students who are more prepared to take risk are more likely to borrow. This variable is measured on a scale from 1 to 10; the average value in our sample is somewhat above 6 with a standard deviation of 2. An increase in the risk attitude of one standard deviation increases the probability of taking up a loan by a bit more than 4 percentage points.

The final column in Table 2 augments the previous model with a term related to debt aversion. As we mentioned, including this term as an explanatory variable assumes that it is exogenous. This implies that this model assumes that causality runs from debt aversion to borrowing behaviour and not the other way around. This thus rules out that having debts affects individuals' attitudes. If we are prepared to make this assumption, we conclude from the results in the third column that debt aversion is a very important determinant of actual borrowing behaviour. A student who scores 1 standard deviation higher on the debt aversion scale is about 14 percentage points less likely to take up a loan. Notice that in the full model most of the effects discussed above remain intact. The most notable change is that the risk aversion parameter is cut in half.

To separate the causal impact of debt aversion on borrowing behaviour from the mere correlation between these two variables, one needs a source of variation of debt aversion that has no direct impact on borrowing behaviour

⁷ Estimated marginal effects from a probit model are very similar to the results presented in the text.

Table 2
Determinants of borrowing decision; marginal effects from linear probability model

| Variable | Standard model | Uncertainty model | Behavioural model |
|-------------------------------|----------------|-------------------|-------------------|
| Income parents | | | |
| Far below 2200 net per month | Reference | Reference | Reference |
| Somewhat below 2200 | 0.007 0.037 | 0.008 0.037 | 0.009 0.036 |
| Around 2200 | 0.000 0.034 | -0.002 0.033 | -0.006 0.033 |
| Somewhat above 2200 | -0.053 0.032 | -0.052 0.032 | -0.059 0.030 |
| Above 2200 | -0.065 0.032 | -0.070 0.032 | -0.087 0.031 |
| Far above 2200 | -0.112 0.037 | -0.115 0.037 | -0.090 0.038 |
| Earnings in 2 years | 0.015 0.015 | 0.016 0.015 | 0.007 0.015 |
| Earnings in 5 years | -0.010 0.008 | -0.007 0.008 | -0.009 0.007 |
| Discount rate | 0.326 0.043 | 0.298 0.044 | 0.281 0.042 |
| Age | 0.054 0.006 | 0.053 0.006 | 0.048 0.005 |
| University = 1 | 0.091 0.016 | 0.096 0.016 | 0.064 0.016 |
| Test score | 0.001 0.002 | 0.001 0.002 | -0.000 0.002 |
| School advice | 0.013 0.009 | 0.012 0.009 | 0.007 0.009 |
| Female | -0.020 0.016 | -0.013 0.016 | -0.024 0.015 |
| Probability to complete study | | 0.015 0.015 | 0.004 0.014 |
| Probability to find job | | -0.021 0.013 | -0.019 0.013 |
| Risk attitude | | 0.020 0.004 | 0.011 0.004 |
| Debt aversion | | | -0.181 0.009 |
| Number of observations | 5621 | 5621 | 5621 |
| Adjusted R-squared | 0.117 | 0.126 | 0.217 |

Note: All regressions also include dummies for missing values of parents' income, age, female, test score and school advice. Robust standard errors are in parentheses.

but affects borrowing behaviour only through its effect on debt aversion. As we admitted above, we find it very hard to come up with such an exogenous source of variation. The problem with such instrumental variables is that the assumption that they have no direct impact on the outcome of interest (borrowing decisions) is not testable.

A possible source of exogenous variation in students' debt aversion is the debt aversion of their parents. Using parents' debt aversion as instrumental variable thus assumes that parents' debt aversion has no direct impact on students' borrowing decisions. This assumption should hold, conditional on the other explanatory variables in the model including parents' income. This in turn assumes that given parents' income, parents with a higher degree of debt aversion take no actions to affect their children's borrowing behaviour other than through their debt aversion. It also assumes that parents' debt aversion is not affected by their children's borrowing behaviour; hence parents should not become more lenient towards debts if their children take up loans. While we cannot exclude that the mechanisms that are assumed not to operate may in practice be of some importance, we think it a worthwhile exercise to estimate the full model using parents' debt aversion as an instrument for students' debt aversion.

The first stage results from a regression of students' debt aversion on parents' debt aversion, a dummy for missing value of parents' debt aversion and the other covariates from the full model point to a very high conditional correlation between the two debt aversion measures. The coefficient of parents' debt aversion equals 0.525 (S.E. 0.014) and the *F*-value on a test for joint significance of the two instruments equals 740 (a value below 10 may point at a weak instruments problem). The effect of students' debt aversion (instrumented by parents' debt aversion) on borrowing behaviour is now -0.341 (S.E. 0.017). This suggests that there is indeed a rather large causal effect of students'

debt aversion on borrowing behaviour. This lends support for the full model in which the standard model is augmented with a term suggested by behavioural economics. The fact that the size of the effect doubles after instrumenting is somewhat surprising. A possible explanation is that students' debt aversion is measured with error thus giving rise to a bias towards zero.

Before we can turn to the implications of our findings for policy, we also need to analyse to what extent students will increase their study time if they would borrow more. As we argued in the introduction, an important argument in the Dutch policy debate in favour of stimulating students to borrow, is that this should be accompanied by a reduction in the amount of time students spend on part-time jobs and should boost the amount of time devoted to their study.

Simply comparing study hours and working hours between students who borrow and students who do not borrow is unlikely to give an unbiased estimate of the effect of borrowing on working hours and study hours. The reason is that the two types of students (borrowers and non-borrowers) probably also differ in other important aspects that determine their time-use. Instead we examine this issue by analysing students' responses to the hypothetical question how many hours they would spend on their study if they would not spend time on a part-time job. The number of study hours reported by the respondents is on average equal to 27.6 h per week (S.D. 9.7). The average number of working hours equals 7.7 h per week (S.D. 6.9). The reported increase in study hours when working hours would be set equal to zero is on average equal to 1.8 (S.D. 4.4). This suggests a substitution rate between the two sorts of time use of about 0.25.

In Table 3 we report the results from several regressions to see how robust this substitution rate is to the inclusion of covariates. The result in column (1) is based on a specifica-

Table 3
Determinants of change in study hours

| Variable | (1) | (2) | (3) | (4) |
|------------------------|---------------|----------------|-------------------|-------------------|
| Working hours | 0.253 (0.008) | 0.229 (0.015) | 0.228 (0.015) | 0.226 (0.015) |
| Number of observations | 5621 | 5621 | 5621 | 5621 |
| Adjusted R-squared | | | | |
| Control variables | None | Standard model | Uncertainty model | Behavioural model |

Note: Regressions also include dummies for missing values of parents' income, age, female, test score and school advice. Robust standard errors are in parentheses.

tion without covariates. The variables included in columns (2)–(4) are those implied by the three economic models discussed above. In all four specifications the substitution rate is equal to 0.25; inclusion of covariates does not affect this. The important implication is that if students could be persuaded to take up more loans to fund their study so that they can cut down the number of hours spend on part-time work, that this will only have a modest effect on study hours. Apparently, students value the extra hours spent on their study by about one fourth of their hourly wage rate. This in turn suggests that current study hours are close to what students perceive as optimal even when time constraints are relaxed.

5. Summary and discussion

The analysis presented in this paper is motivated by the observation that only a minority of higher education students in the Netherlands take up the study loans that the government is prepared to lend. Instead many students make ends meet by having a part-time job. These jobs are often unrelated to their field of study and require low skill levels. At the same time many students do not complete their study in the nominal duration of 4 years but require 1–2 years extra. The Dutch government considers this a sub-optimal situation and is looking for ways to stimulate students to borrow more, to spend less time on their jobs and to spend more time on their study.

The Dutch experience with low take-up rates of student loans is not unique. Countries like England and Australia witness very similar behaviour. Increases of the private contributions to higher education in these countries have led many students to raise the required funds by a part-time job. Budgets that governments in these countries have available for study loans are not exhausted.

The results presented in this paper show that standard economic mechanisms explain to some extent why students in the Netherlands are reluctant to borrow. Students from high-income families are less likely to borrow, probably because they receive more support from their parents. Students who have a high subjective discount rate are more likely to borrow. This suggests that the perceived price of a loan (the interest rate relative to the subjective discount rate) does affect the borrowing decisions. A reduction of the interest rate is thus predicted to increase the take-up rate of loans. Given, however, that the current interest rate on study loans in the Netherlands is only 3%, there is very limited scope for a further reduction.

Earnings prospects influence borrowing decisions. Students with characteristics that correlate with better

earnings prospects (university track and males) are more likely to borrow. In contrast, students' subjective earnings expectations and ability indicators appear to have no impact on borrowing decisions.

A final standard economic factor that explains part of students' unwillingness to borrow is their attitudes towards risk. In the Dutch financial aid scheme, students have to repay their study debts in fixed instalments over a period of 15 years provided that their annual income exceeds a certain threshold. This latter provision insures students who borrow against the prospects of the worst possible outcomes; but since the threshold above which students are required to repay is fairly low, the insurance against bad outcomes is only partial.

On grounds of both efficiency and equity, several economists have argued that mortgage type repayment schemes should be replaced by income contingent loans (Barr, 1993; Jacobs & Van der Ploeg, 2006; Oosterbeek, 1998). Under income contingent loans students repay their debts as a percentage of their annual income until they have repaid the entire amount they borrowed. This should eliminate all risks involved in taking up a loan. Our results on the effect of risk attitudes on borrowing decisions suggests that this policy change is likely to have only a modest impact. If risks are eliminated students should borrow as if they were risk neutral. The exact location of the point of risk neutrality on the 1–10 risk attitude scale is unknown. If we make the extreme (conservative) assumption that a score of 10 indicates risk neutrality, and that all other scores thus reflect risk aversion (so no one is risk loving), we can calculate that the take-up rate of loans would go up by 4.4 percentage points (from 35% to 39.4%). While this change is certainly not negligible, we have the impression that advocates of income contingent loan schemes are expecting more substantial effects.

As a non-standard determinant of borrowing decisions we considered debt aversion. If we assume that debt aversion is a fixed trait of individuals, we must conclude that borrowing decisions are heavily influenced by this attribute. Our attempt to address potential endogeneity of debt aversion by an instrumental variable approach points in the same direction. This conclusion is consistent with the results recently reported by Field (2006).

Graduate taxes are often considered to be an imperfect version of income contingent loans (Barr, 1993; Oosterbeek, 1998). Under graduate taxes, borrowers may end up repaying (much) more than they borrowed, and the tax can easily be evaded by moving to another country. In the presence of debt aversion, however, graduate taxes also have an important advantage over an income contingent loan scheme.

Young people with a high degree of debt aversion may decide not to enrol in higher education under an income contingent loan scheme, whereas under a graduate tax they will enrol.

Even if effective policies can be implemented to increase the take-up rates of study loans and to reduce the time students spend on part-time jobs, we should not be overly optimistic about the impact that this will have on the amount of time students use for their study. Our results suggest that if all students quit their part-time jobs that this will increase study hours by no more than 7% (from 27.6 to 29.4 h per week).

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Appendix A. Details of some of the survey instruments

Uncertainty about study completion and finding a job

To assess respondents' uncertainty about study completion we asked them "How certain is it that you will complete your current study?". Answers could be given on a four-point scale: certainly not, probably not, probably, certainly. To assess their uncertainty regarding finding a suitable job, we asked them "Do you expect to find a job that fits the degree you will obtain?" Answers could be given on the same four-point scale.

Earnings expectations

To gather information about earnings expectations we asked respondents what net monthly income they expected to earn 2 (5) years after graduation. Questions of this type have been asked before and responses turn out to be reasonably accurate (Brunello, Lucifora, & Winter-Ebmer, 2004; Hartog & Webbink, 2004).

Risk attitude

To measure risk attitudes we asked the question suggested by Dohmen et al. (2005). This question reads: How do you see yourself: "Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Please tick a box on the scale, where the value 0 means: 'unwilling to take risks' and the value 10 means 'fully prepared to take risk'." According to the Dohmen et al this general risk question is the best all-around predictor of risk taking behaviour in different contexts, and outperforms a lottery question or domain-specific measures. We adapted the scale from a 0–10-scale to a 1–10-scale because this is a scale where Dutch citizens are used to; school grades are (starting in primary school) given on a scale from 1 to 10.

Discount rate

To measure the discount rate we asked a series of six questions. The first question asks respondents which of two options they prefer, 1000 euros today or 1100 euros a year from today. The second question gives respondents the choice between 1000 euros today and 1200 a year from today. Each next question adds 100 euros to next year's option until the amount of 1600 is reached. Depending on the point where respondents switch to next year's option we assign them discount rates of 0.10, 0.20, . . . , 0.60. To persons who already prefer 1100 next year to 1000 today, we assign discount rate 0.10 and to persons who prefer 1000 today to 1600 next year, we assign a discount rate of 0.60. This approach to elicit time preferences has been used quite often (cf. Frederick, Loewenstein, & O'Donoghue, 2002).

Debt aversion

Information on respondents' debt aversion is obtained from the question "What is your attitude towards borrowing?". Answers could be given on a four-point scale: very negative, negative, positive, very positive.

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