

# Does Academic Achievement Kill Recreational Reading?

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## ABSTRACT

Several studies have pointed out an empirical relationship between recreational reading and academic performance, even though the strength of the relationship varies to a great extent. However the issue of the impact of academic performances on recreational reading has been neglected by literature. The purpose of the paper is to empirically investigate this latter relationship. We use an on-line survey conducted among the students of the University of Bologna in the period May-July 2010 concerning students' reading and studying habits. Due to the potential endogeneity of academic performances and recreational reading, a three-stage estimation for system of simultaneous equations has been used. The main findings show that, whereas studying positively affects reading attitude in the long run, during the university years the time and effort devoted to study reduces the time available for recreational reading.

**JEL Classification:** C6, Z1

**Key Words:** cultural capital, reading, academic performance

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## 1. Introduction

As reading is crucial in almost every activity, and particularly in the accumulation of knowledge, a number of studies have analyzed how reading habits affects the academic performance of students (Bastug, 2014; Chotitham and Wongwanich, 2014; Gaddis S.M., 2013; Keskin, 2013; Thrupp, 2013; Jaeger, 2011; Wildhagen 2010; Wilms, 2010; Jaeger, 2009; Wildhagen, 2009; Meneghetti et al. 2006; Pretorius, 2002; Sullivan, 2001; Lazarus and Callahan, 2000). However, better performances at school require to devote more time to study and less time to recreational activities, reading among them.

Recreational reading, also referred to as leisure reading or independent reading, involves students' self-choice of reading on their own. Recreational reading constitutes a very personal choice, as reading comes from a large variety of sources, and choosing what, when and how one reads for own pleasure, does not involve any assignment of it, request of a report, or checks on comprehension (Cullinam, 2000).

The ability to read and comprehend a content is considered one of the basic conditions for success in life (Thrupp; 2013; Van den Broek & Espin, 2012). Children who read for pleasure are likely to do significantly better at school (Institute of Education, 2011), and later on, on the labor market (Brunello et al., 2012) than peers who are weak readers.

To the best of our knowledge, the issue of the impact of school and academic performances on recreational reading has been neglected by the literature. Although several surveys have shown that many primary and middle school students do not choose to read large quantities, nor do they choose to read often (Anderson, Fielding, and Wilson 1988; Morrow and Weinstein 1986; Greaney 1980), how academic performance impacts on recreational reading is still an open question. The purpose of this paper is to clarify this point.

Using an on-line survey conducted among University of Bologna students in the period May-July 2010, a three-stage estimation for system of simultaneous equations has been adopted. The main findings show that whereas studying may positively affect reading attitude in the long run, during the university years the time and effort devoted to study tend to reduce the time left for recreational reading. This result is particularly stronger for males and for students enrolled in

humanities, classical studies, foreign languages, social sciences, applied, engineering and technical sciences degrees.

## 2. Method

Our empirical investigation relies upon an on-line survey conducted among students enrolled at the University of Bologna (UniBo) in the period May-July 2010. The study included 27,616 answers, 16.40% of the UniBo students. Although it derives from a voluntary participation to the survey rather than from a pre-ordered sampling design, the sample structure is tested to be representative of the population (Table 1). The ages of the participants, which were categorized by their age in months, ranged from 18 to 28 years old; 10,876 of the answers (39.38% of the sample) were of males students and 16,740 (60.62%) of females.

In this paper we analyze whether academic performance might somehow reduce time for recreational reading, measured by the number of books that a student reports having read in the last year (*reading*). The idea is that better and frequent academic achievements, proxied by the number of exam passed (*nr\_exams*), are more time consuming so to force students to have less time to dedicate to other activities, and in particular reading non-academic books. We are aware of the likely endogeneity of such independent variable in an equation that estimates its impact on the recreational reading. Hence, to control for the simultaneity between the reading and academic performance, we jointly estimate them as a two-simultaneous equation system, using the estimation method of three-stage least squares.

Research indicates that many other determinants affect recreational reading. We consider four sets of independent variables: socio-demographic characteristics of respondents; university context; student characteristics; and cultural capital features.

### *Socio-demographic characteristics*

Among socio-demographic features we include gender, *gender*, a dummy variable which assumes value 1 if female, zero otherwise. It has been found that a higher percentage of girls indulge in leisure reading than boys (Abilock, 2002; Swalander & Taube, 2007). Moreover, the females show a more positive attitude to reading (see Logan, 2009; Abdul Karim and Hasan, 2007; Swalander & Taube, 2007; Van Schooten et al., 2004; Gallik, 1999; Stockmans, 1999; Kirsch and Guthrie, 1984)

and a preference for reading a variety of genres compared to males (Clark, Osborne & Akerman, 2008).

Another variable often considered in studies on the effects of cultural capital on school achievement is *age*, since it affects the time assigned to specific cultural and leisure activities and reading preferences (Horvat and Davis, 2011; Abdul Karim and Hasan, 2007; Reay, 2004; Van Schooten et al., 2004; Levya, 2003; Kraaykamp, 1999; Stockmans, 1999; DiMaggio, 1997). However, due to the high correlation with the year of enrollment at University (a variable belonging to the second set of covariates), we drop age in order to avoid both conceptual overlapping between the effects of the variables and statistical multicollinearity problems.

### *University context*

The enrollment Faculty implicitly detects set of preferences related to academic and cultural subjects. For example, we expect that a student enrolled in a BA in Classical Studies tends to spend more time in reading for leisure or academic purposes than a student enrolled in a chemistry BA because of the different types of studies and role of practices in laboratories. In this study, we aggregate faculties and degrees in five fields of study, in order to capture these differences: social science degrees, *social*; technology and applied science degrees, *tech*; mathematics, physics and natural science degree, *math*; humanities, classical studies, foreign languages and literature degrees, *humanities*; and pharmacy, human and veterinary medicine degrees, *medicine*. Each field dummy is equal to 1 if the student is enrolled in a university course belonging to that field, and zero otherwise.

During the period of university study, students may change the time devoted to reading and studying. In fact, the larger the number of exams passed or the relative level of difficulty of subjects studied during the year, the lower the time devoted to leisure activities (reading included). The year of enrollment, *year\_enrol*, can thus affect both the reading activity and the number of exams passed. Moreover, as highlighted in several studies, the year of enrollment may change not only the studying technique of the student, but also her reading attitude and the time spent to read (Stokmans, 1999).

Finally, the distance between the university location and student residence city may affect the time devoted to read and study. For example, every day commuters spend time on car or public

transport to move to/from the University city. During this time, they can do only a few activities, such as talking with friends, playing with electronic devices, making phone calls, reading for pleasure or studying. Similarly, students renting flats in the University city (non-resident students) spend time to organize their life (such as cooking, cleaning, etc.) differently from those students living with their family (residents and commuters). We therefore consider dummies for commuter, resident and non-resident students, *commuter*, *resident*, *nonresident*, respectively, to take into account this aspect.

### *Student characteristics*

Proficient students tend to read more for leisure and, following a virtuous circle, strong readers better perform at school (Van Schooten and de Glopper, 2003; Stokmans, 1999). For this reason, we use the high-school final mark, *mark*, as a proxy for student ability and we expect it positively affects the number of exams passed and the number of books read in a year.

As already pointed out, sometimes time constraint is binding. This implies that devoting more time to academic activities reduces time to recreational activities. When the time constraint does not bind, spending more time to study does not affect the time devoted to leisure activities. We consider the percentage of lectures attended, *lecture\_attend*, as a proxy of the amount of time spent at the University, as well a signal of possibly time consuming style of studying, that makes more likely the relevance of the time constraint, because time is allocated to study rather than to recreational activities.

Of particular relevance is also the effect exerted by peers, both on academic performance and on reading. When students study with classmates, sometimes the boundary between study and leisure activities may become less sharp. Studying with peers affects the time and approach to study. Academic performances may improve or worsen (depending on the characteristics of the peer group)<sup>1</sup> and, at the same time, the continuous exchange of ideas can affect habits and

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<sup>1</sup> When students study with peers, even if the knowledge accumulation process is subjective, they must share and accept the rules of the group, even if inefficient (e.g. less talented peers might delay the study process). In specific contexts (e.g. when conducting experiments in laboratories, the "how to" is common knowledge and can be standardized, to a certain extent), peer groups are more efficient than individual studying.

recreational activities, including reading. Moreover, peers may negatively affect individual reading since being in group (and possibly studying) is an alternative activity. At the same time, studying with mates is not a customized (and possibly time use efficient) studying technique. These points are captured by a 5-point Likert scale variable, *peer*, that measures the importance that students attach to studying in group in order to pass exams (Tramonte and Willms, 2010; Duncan, Haller, & Portes, 1968).

### *Cultural capital*

Family background, or more generally cultural capital, refers to variables strongly linked to activities in the home environment that support literacy development. As children grew up in the family, parents would have an influence on the students' attitude toward reading. They encouraged the children to read by involving in their reading, modelling leisure reading, creating and providing reading materials at home and fostering good self-concept as readers into the children self-esteem (Tramonte and Willms, 2010; Cheadle, 2009; Cheadle, 2008; Abdul Karim and Hasan, 2007; Mckool, 2007; Cheung and Andersen, 2003; Lareau and Weininger, 2003; Kraaykamp, 2003; Dumais, 2002; Partin, 2002; DeGraaf et al., 2000; Fitzgerald, 1997; Mohr and DiMaggio, 1995). We consider parental education by introducing in our model two categorical variables, for mother and father, *mother\_edu* and *father\_edu*, ranging from 1 to 4<sup>2</sup>. Moreover, to capture this point we include also the size of home library, *library*, a variable that contains the estimated number of books in the family house.

In order to identify proactive behaviors reflecting dynamic cultural capital (Tramonte and Willms, 2010), we also asked students to state how they got the last (non-academic) book read. We distinguish between books bought in libraries, shopping center, etc., *book\_purch*, a dummy variable which assumes value of 1 if a purchased book, zero otherwise; books borrowed in public or private libraries, *book\_libr*, a dummy variable which assumes value of 1 if a library book, zero

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<sup>2</sup> These variables assume value 1 if the parent has no education or finished the primary school; 2 if he/she finished the middle school; 3 if he/she got a high school diploma; 4 if he/she received a degree or higher level of education).

otherwise; and books received as gift or borrowed by friends, *book\_free*, a dummy variable which assumes value of 1 if the book was a gift or lent by friends, which identify students less active to invest in cultural capital, and zero otherwise.

Table 1 summarizes the main statistics of the sample.

[TABLE 1 ABOUT HERE]

### 3. Results

#### 3.1. Full sample

To find out the main effect of the independent variables on the dependent variable recreational reading, a three-stage least square estimation has been adopted. As discussed in the introduction, besides other marginal activities, students allocate their time among academic and leisure activities. Hence, since time constraint is binding, devoting more time to study reduces the time for leisure activities, including recreational reading. By contrast, reading is demonstrated to lead to better academic achievement, which, in turn, stimulates recreational reading. Both these aspects highlight that reading attitude and academic performances (measured through the number of exams passed) are endogenous, and in order to deal with these variables we use a three-stage least square approach. Table 2 displays the estimated coefficients of the simultaneous equation system.

[TABLE 2 ABOUT HERE]

As it emerges from Table 2, the time constraint is actually binding for students enrolled at the university. Therefore, although in the long run reading leads to better academic performances and vice versa, the opposite occurs during the university years. The larger the number of passed exams, the lower the time devoted to recreational reading, or, conversely, the larger the number

of hours devoted to reading, the lower the number of passed exams over time. However, as preferences change over time and tastes refine and specialize, the older the student is, or the higher the number of years of enrollment is, the greater the time spent to both studying and leisure reading.

A gender gap in reading achievement and attitudes is confirmed by our results. As expected, female students devote more time to both read and study.

Spending time to attend lectures fosters the number of passed exams. The number of exams passed strictly depends on the type of degree program to which students are enrolled and on the size of exams in terms of university credits. Therefore, being enrolled in specific degree courses affects the number of exams passed. At the same time, the field studied affects the time spent in reading for recreational purposes: as expected, students enrolled in humanity, classical studies, foreign languages, social sciences seem to read more than students studying more technical or experimental subjects. Additionally, brilliant students, with higher final mark at the secondary school, read and study more than less proficient students, triggering positive virtuous feedbacks.

Despite this belief that interaction with classroom peers can affect one's educational outcomes, recreational reading seems not to be affected by peers. Moreover, another an unexpected result is represented by commuters who do not seem to read more than resident students. Although recreational reading is not common among commuters, however, non-resident students devote more time to leisure reading than both resident and commuters ( possibly because a self-selection mechanism is stronger for non-resident students).

Moving to family background, parents with a higher education levels foster reading habits. In fact, parents that are used to read, with a large home library, stimulate the reading attitude of offspring. Finally, as expected, dynamic students, from a cultural point of view, seeking books to be read in libraries or bookstore, read more than inactive students who read books donated, loaned by friends or available in home library; in both cases the effects are positive and statistically significant.



### 3.2. Gender effect

The results in Table 2 suggest that gender affects reading behavior. However, due to the aggregate nature of data and of the likely different attitudes towards reading among genders, a further investigation is necessary. To this aim, it can be useful to re-estimate the model conditional on gender. Results are reported in Table 3.

[TABLE 3 ABOUT HERE]

Analogously to the full sample case, we find that both females and males reduce recreational reading as academic achievement increases. However, the differences in recreational reading are gender-sensitive, since females are less affected in their attitude compared with males.

The effort and the time required to study have a negative effect on reading activity (10 per cent significance).

The distance between the university location and student residence city only affects non-resident females who read more than resident and commuter females.

No significant difference emerges if considering the effect of lecture attendance on the number of exams passed. By contrast, for both genders, studying in group does not affect the number of exams passed but decreases reading activities, implying a sort of substitution effect between reading and spending time with peers.

Moving to cultural capital, more educated mothers have positive effects on daughters' reading activities (at 10 per cent significance level), whereas more educated fathers positively affect sons' reading propensity, confirming the importance of the same gender parents-offspring links in the cultural accumulation process (Raley and Bianchi, 2006). Finally, the effects of the home library size and the dynamic cultural behavior of students do not differ with respect to the full sample case.

### 3.3. Scientific sector

Analogously to the approach adopted in the previous sub-section, we divide our 27,616 original respondents according to the field of study. We therefore split the full sample into five sub-samples. Results are reported in Table 4.

[TABLE 4 ABOUT HERE]

The empirical investigation for the impact of field of study of the student on her/his recreational reading shows that more effort and time devoted to study negatively affects reading of students enrolled in technical and applied sciences, social sciences (at 10% significance level) and humanities and foreign languages fields (at 10% significance level). In line with the empirical studies in education, this results captures the different complexities of some academic courses which require more time to (successfully) pass exams. On the other hand, spending more time in reading negatively impacts academic performances of students enrolled in medicine disciplines, humanities, foreign languages, mathematics, physics and natural sciences.

More experienced students read more if enrolled in technical degrees, in social sciences (at 10% significance level), in humanities and foreign languages (at 10% significance level). Differently from the full sample case, studying with peers affects neither reading nor studying activities, with the exception of students enrolled in mathematics, physics and natural science degrees, where studying in group exerts a negative effect on the number of passed exams. The distinction between resident, non-resident, commuter students has no effect on reading and studying activities (excepted for students of health disciplines).

Moving to cultural capital, the role exerted by parents differs across fields of study: more educated mothers stimulate reading if sons are enrolled in social science and humanities degrees or in “soft fields”, whereas more educated fathers encourage reading if sons study more technical or “hard” subjects (health and natural sciences, mathematics, physics or engineering disciplines).

Cultural capital variables, specifically those linked to books (size of the home library, number of books borrowed or purchased), exert positive impact upon reading, independently of the field of study.

No significant difference with respect to the general sample (Table 1) emerges in terms of gender, secondary school final mark, lecture attendance, library size and dynamic behavior of students.

### *3.4. Sub-sample comparison*

Splitting the full sample into both gender and scientific sector sub-samples allows us to analyze whether differences emerge across groups. In order to identify different behaviors among sub-samples and to test whether these differences statistically differ among sub-samples, a series of  $\chi^2$  tests has been computed. In particular, for both the sub-sample assessments, we tested if differences are statistically significant for the overall model and for the groups of variables identified in Section 2. Results are displayed in Table 5. The null hypothesis considers that each single coefficient referred to a specific variable (with the exception of the constant term) in each group of variables is the same independently of the sub-sample (e.g.  $\beta_{1, \text{male}} = \beta_{1, \text{female}}$  and  $\beta_{3, \text{male}} = \beta_{3, \text{female}}$ ).

The empirical evidence shown in Table 5 suggests that not only all the coefficients are not simultaneously equal across the considered sub-samples (overall  $\chi^2$  test) but also that, if considering subsets of variables (university context variables, student characteristics, cultural capital features), they are not stable across sub-samples.

[TABLE 5 ABOUT HERE]

These tests show that the estimated coefficients significantly differ across sub-samples and, therefore, it makes sense to identify different targets of students to analyze their reading preferences and cultural behaviors.

## **4. Conclusions**

Although there exists an extensive literature on the effects of reading on academic achievement, to the best of our knowledge, the issue of the impact of academic performances on recreational reading has been neglected so far.

Using an on-line survey conducted among students of the University of Bologna in the period May-July 2010, a three-stage estimation for system of simultaneous equations has been used to investigate both students' leisure reading and studying habits. The main findings show that, whereas studying may positively affect reading attitude in the long run, during the university years the time and effort devoted to study shrinks the time left for recreational reading.

In order to explore in details differences between gender and fields of study, we proceeded by splitting the full sample into different sub-samples. Females are proved to be less affected by academic achievements in their attitude to recreational reading compared with males. Moreover, significant differences emerge across fields of study confirming that academic courses which call for more time to (successfully) pass exams are associated to a reduction in leisure reading.

In summary, this study provides (totally) new information about the effects of academic studying on reading. The empirical evidence suggests that in analyzing reading behavior, academic performances do matter. Moreover, there is no easy fix for the achievement gap that exists between female and male students in recreational reading. We are not in the position to conclude that such a result leads to the conclusion that females have necessarily more leisure time. It could occur, in fact, that females are more efficient in studying than males so to have more leisure time to spent on reading. But, at the same time, females could have stronger preferences for reading than males, and are more likely to sacrifice other leisure activities to increase reading. Anyway, whatever the work hypothesis, we can conclude that being a proficient student implies to sacrifice, at least partially, the pleasure of reading.

On the basis of the limitations of this study, in the future more attention should be devoted to identify and collect data on different cultural capital measures and cultural and recreational activities which might affect both individuals' time constraint (since the share of time devoted to recreational reading depends on sets of hobbies that compete in terms of leisure time) and preferences. Moreover, more attention should be paid to the complex interactions among peers which may impact in many ways on individuals' choices and behaviors.

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TABLE 1. Descriptive statistics

	Type	no. obs	Percentage	mean	min-	std.dev.
<i>Dependent variables</i>						
Nr exams	O	27392		2.386	1-4	1.200
Reading	C	25624		6.669	0-100	8.400
<i>Socio-demographic characteristics</i>						
Gender (Female =1 ; Male=0)	D	27616	60.62%		0-1	0.489
Age	C	24322		22.310	18-28	24.515
<i>University context</i>						
Year-enrol	C	27004		2.859	1-7	2.057
Social sc.	D	27348	36.49%		0-1	0.481
Tech	D	27348	17.90%		0-1	0.383
Math (omitted)	D	27348	10.01%		0-1	0.300
Humanities	D	27348	23.04%		0-1	0.421
Medicine	D	27348	12.56%		0-1	0.331
Commuter	D	27482	38.29%		0-1	0.486
Non resident	D	27482	42.86%		0-1	0.495
Resident (omitted)	D	27482	18.86%		0-1	0.391
<i>Student characteristics</i>						
Mark	C	26620		83.798	60-100	12.480
Lecture attend	O	27430		3.117	1-4	1.159
Peer	O	27384		2.879	1-5	1.254
<i>Cultural capital variables</i>						
Mother_edu	O	27234		2.868	1-4	0.853
Father_edu	O	27062		2.836	1-4	0.888
Library home	C	22860		342.019	0-4500	496.343
Book_libr	D	26294	18.80%		0-1	0.391
Book_purch	D	26294	53.62%		0-1	0.499
Book free (omitted)	D	26294	27.59%		0-1	0.447
O=ordinal variable; C=continuous variable ; D=dummy variable						

TABLE 2. Three-stage least squares on full sample

VARIABLES	(1) Reading	(2) No. Exams passed
Nr exams	-2.649*** (0.511)	
Reading		-0.00929*** (0.00338)
Gender	0.598*** (0.132)	0.0328** (0.0132)
Year_enrol	1.057*** (0.199)	0.402*** (0.00312)
Social	0.449* (0.246)	0.267*** (0.0221)
Tech	-0.615** (0.250)	0.150*** (0.0240)
Humanities	1.801*** (0.239)	0.196*** (0.0240)
Medicine	0.573 (0.357)	0.477*** (0.0259)
Commuter	0.133 (0.162)	
Nonresident	0.396** (0.160)	
Mark	0.0466*** (0.00623)	0.00609*** (0.000521)
Lecture_attend		0.111*** (0.00595)
Peer	-0.144*** (0.0499)	-0.0105** (0.00506)
Mother_edu	0.168** (0.0844)	
Father_edu	0.224*** (0.0812)	
Library	0.00176*** (7.61e-05)	
Book_libr	1.889***	

	(0.173)	
Book_purch	2.042***	
	(0.142)	
Constant	2.362***	0.210***
	(0.603)	(0.0556)
Observations	20,538	20,538
R-squared	-0.001	0.463

\*, \*\*, \*\*\*, significance at .01;.05;.10 per cent confidence level, respectively.

TABLE 3. Three-stage least squares on gender sub-samples

VARIABLES	Females		Males	
	(1) Reading	(2) nr_exams	(3) reading	(4) nr_exams
Nr exams	-1.877*** (0.658)		-3.739*** (0.809)	
Reading		-0.00798* (0.00452)		-0.00875* (0.00494)
Year_enrol	0.798*** (0.265)	0.416*** (0.00405)	1.397*** (0.301)	0.385*** (0.00489)
Social	-0.564* (0.331)	0.240*** (0.0308)	1.550*** (0.378)	0.289*** (0.0332)
Tech	-1.015*** (0.388)	0.171*** (0.0370)	0.0248 (0.336)	0.149*** (0.0321)
Humanities	0.524 (0.320)	0.144*** (0.0315)	3.727*** (0.384)	0.277*** (0.0400)
Medicine	-0.278 (0.465)	0.457*** (0.0350)	1.243** (0.559)	0.486*** (0.0404)
Commuter	0.351 (0.220)		-0.121 (0.241)	
Nonresident	0.573*** (0.218)		0.165 (0.234)	
Mark	0.0466*** (0.00803)	0.00598*** (0.000671)	0.0471*** (0.00996)	0.00623*** (0.000827)
Lecture_attend		0.111*** (0.00742)		0.112*** (0.00987)
Peer	-0.142** (0.0644)	-0.00817 (0.00641)	-0.137* (0.0792)	-0.0128 (0.00820)
Mother_edu	0.189* (0.112)		0.123 (0.129)	
Father_edu	0.0730 (0.108)		0.446*** (0.124)	
Library	0.00196*** (0.000108)		0.00155*** (0.000106)	
Book_libr	1.960*** (0.230)		1.797*** (0.261)	

Book_purch	1.573*** (0.188)		2.708*** (0.218)	
Constant	3.130*** (0.819)	0.226*** (0.0745)	2.419*** (0.929)	0.229*** (0.0873)
Observations	12,318	12,318	8,220	8,220
R-squared	0.018	0.478	-0.036	0.446

\*, \*\*, \*\*\*, significance at .01;.05;.10 per cent confidence level, respectively.

TABLE 4. Three-stage least squares on scientific sector sub-samples

VARIABLES	Social sciences		Technical and applied sciences		Math, phisic natural sciences		Humanities and languages		Human and veterinary med. and pharmacy	
	reading	nr_exams	reading	nr_exams	reading	nr_exams	reading	nr_exams	Reading	nr_exams
Nr_exams	-1.445*		-5.147***		-1.618		-3.544*		-1.825	
	(0.744)		(0.861)		(1.121)		(1.972)		(1.583)	
Reading		-0.00415		-0.00120		-0.0165**		-0.0112**		-0.0303***
		(0.00675)		(0.00926)		(0.00798)		(0.00534)		(0.00878)
Gender	0.200	0.0327	1.657***	0.0871***	1.993***	0.0631	-0.900***	-0.0515*	1.550***	0.0721*
	(0.211)	(0.0226)	(0.299)	(0.0335)	(0.382)	(0.0425)	(0.338)	(0.0267)	(0.360)	(0.0399)
Year_enrol	0.520*	0.391***	2.054***	0.396***	0.547	0.364***	1.580*	0.430***	0.781	0.430***
	(0.281)	(0.00532)	(0.331)	(0.00697)	(0.398)	(0.0101)	(0.830)	(0.00604)	(0.655)	(0.0102)
Commuter	-0.0674		-0.314		0.662		0.537		0.416	
	(0.262)		(0.304)		(0.505)		(0.452)		(0.415)	
Nonresident	0.369		-0.0330		0.710		0.655		0.705*	
	(0.274)		(0.312)		(0.473)		(0.429)		(0.426)	
Mark	0.0527***	0.00537***	0.0478***	0.00754***	0.0362**	0.00342**	0.0678***	0.00691***	0.00841	0.00682***
	(0.00938)	(0.000909)	(0.0140)	(0.00128)	(0.0164)	(0.00167)	(0.0189)	(0.00101)	(0.0193)	(0.00144)
Lecture_att		0.109***		0.174***		0.185***		0.0651***		0.119***
		(0.00912)		(0.0184)		(0.0222)		(0.0106)		(0.0211)
Peer	-0.0918	-0.0130	-0.118	-0.0104	-0.123	-0.0402**	-0.145	0.0146	-0.115	-0.0114
	(0.0764)	(0.00836)	(0.114)	(0.0126)	(0.158)	(0.0160)	(0.135)	(0.0101)	(0.135)	(0.0146)
Mother_edu	0.341**		-0.00654		0.281		-0.0203		0.0115	
	(0.137)		(0.167)		(0.267)		(0.207)		(0.219)	
Father_edu	0.0454		0.496***		0.821***		-0.0375		0.439*	
	(0.138)		(0.159)		(0.258)		(0.194)		(0.227)	
Library	0.00143***		0.00136***		0.00142***		0.00241***		0.00286***	
	(0.000120)		(0.000153)		(0.000200)		(0.000201)		(0.000305)	
Book_libr	1.757***		1.314***		3.828***		1.932***		1.206***	
	(0.286)		(0.327)		(0.526)		(0.422)		(0.445)	
Book_purch	1.827***		2.167***		2.699***		2.089***		1.462***	
	(0.233)		(0.285)		(0.404)		(0.359)		(0.358)	
Constant	1.478	0.547***	4.488***	-0.0298	-1.232	0.410**	4.722***	0.407***	3.678*	0.626***
	(0.981)	(0.0827)	(1.267)	(0.150)	(1.875)	(0.166)	(1.454)	(0.0955)	(2.030)	(0.159)
R-squared	0.015	0.434	-0.353	0.466	0.073	0.374	-0.008	0.522	0.033	0.414

\*, \*\*, \*\*\*, significance at .01; .05; .10 per cent confidence level, respectively.

TABLE 5. Robustness tests for parameter stability

VARIABLES	DF	$\chi^2$ test value	$\chi^2$ value tab (5%)	p-value	Result
<b><i>Gender sub-samples</i></b>					
Overall	$\chi^2(24)$	8616.08	36.415	0.0000	Reject
University context	$\chi^2(12)$	6941.27	21.0261	0.0000	Reject
Student characteristics	$\chi^2(5)$	276.59	11.0705	0.0000	Reject
Cultural capital	$\chi^2(5)$	438.84	11.0705	0.0000	Reject
<b><i>Scientific field sub-samples</i></b>					
Overall	$\chi^2(25)$	8497.52	37.6525	0.0000	Reject
Socio-demographic charact.	$\chi^2(1)$	14.52	3.84146	0.0001	Reject
University context	$\chi^2(4)$	5760.35	9.48773	0.0000	Reject
Student characteristics	$\chi^2(5)$	189.12	11.0705	0.0000	Reject
Cultural capital	$\chi^2(5)$	439.73	11.0705	0.0000	Reject