



ACEI working paper series

**ECONOMIC AND CULTURAL FACTORS AND
ILLEGAL COPYING IN THE UNIVERSITY
TEXTBOOK MARKET**

Antonello E. Scorcu

Laura Vici

AWP-01-2013

Date: February 2013

Economic and cultural factors and illegal copying in the university textbook market[♥]

Antonello E. Scorcu

(Department of Economics, University of Bologna, Italy)

Laura Vici

(Department of Economics, University of Bologna, Italy)

Abstract

The role of economic factors, such as family income, the price of illegal reproductions of books, the enforcement rules and the expected penalties are considered the main determinants of the possible infringements of the copyright law. However, the comparison between individual economic gains and losses offers only a partial explanation, as also cultural individual habits and peer effects exert important influences. Using a unique dataset based on a survey conducted at the University of Bologna, Italy, this paper analyses empirically the relevance of socio-economic as well as cultural determinants in the decision process of using illegal copies of university textbooks. From a policy perspective, the analysis suggests that an effective enforcement of the copyright rules should take into account the cultural behavior and students' learning practices.

[♥] The Authors gratefully acknowledge the financial support of the CRUI-SIAE-AIE Joint Committee for financing the research “La cultura del diritto d’autore nelle università italiane: attitudini e implicazioni da una indagine sul campo”, 2010-12. The Authors would like to thank A.M. Violi for her skilful assistance in the construction of the dataset, and P. Attanasio, G. Candela, R. Cellini and R. Towse for their helpful comments on a previous version of the paper. The usual disclaimers applies.

Antonello E. Scorcu: Department of Economics, Strada Maggiore 45, I-40126 Bologna, Italy. antonello.scorcu@unibo.it

Laura Vici: Department of Economics, Strada Maggiore 45, I-40126 Bologna, Italy. laura.vici@unibo.it

Introduction: the copyright issue in the University textbook market

The interest in copyright has been recently revived by the impetuous process of digitalization of several cultural, educational and entertainment products¹. In this paper, we focus on the attitude and acceptance of the copyright law by university students, a point overlooked in the analysis, which focus instead on the authorship-ownership design.

The copyright law finds its root in the regulation of the book market, a large market composed of several segments (children books, fiction, non-fiction, and also, in more detail, textbooks, novel, poetry, and several other genres). A complementary, but often neglected, classification distinguishes between voluntary and compulsory reading. In the former case, there is an autonomous, *ex-ante*, recognition of the cultural value of the book by the reader, which implies, at least, an implicit positive willingness to pay for its contents. In the latter case, typical of the textbooks, the recognition of the cultural value by the reader might be partial or even null. In such cases, reading has little or no value *per se*, but is instrumental to passing exams. Hence, the recognition of the rights of the authors and publishers can be largely irrelevant in the attitude towards the copyright law of the students.

If, for the same good, there are two markets (a legal and an illegal one) with two prices, the student chooses where to buy the good by maximizing the consumer surplus - the difference between the market price and her consumer reservation price, adjusted for the differences in quality (photocopies are of lower quality with respect to books) and the probability and the severity of punishments, if caught on the illegal market (e.g. fines). However, the use of a legal or illegal copy of a textbook is not necessarily a mutually exclusive choice. In our framework, the complex linkages between the two markets are influenced by the way each student uses a specific version of the textbook on given occasions. In fact, students prepare exams by using a large set of learning tools (lecture notes and recordings, teachers' handout, etc.), and the legal or illegal versions might be at times complements or substitutes.

In order to model this behaviour, we assess the propensity to use illegal copies and the propensity to purchase new textbooks (both measured through an ordinal Likert scale) by estimating two different but interrelated ordered probit regressions, one for each market.

In each regression, the explanatory variables can be grouped into three sets. First, the attitude of the student towards the copyright is related to her personal and family characteristics (the

¹ The interest on copyright goes back to Plant (1934), who dismissed the economic rationale for copyright laws. On the same line Boldrin and Levine (2002), Varian (2005), Shavell (2010) and Müller-Langer and Watt (2010). Comprehensive summaries are in Landes and Posner (2003) and Towse (2006 and 2008).

number of books at home, the reading habits for non-professional reasons, the education level of the parents,...) as well to her cultural and social capital.

Second, we model the role the university student attaches to the textbook in her learning process². The type of subject studied, the type of exam (oral or written, core or non-core) as well as mates' behavior are factors that are likely to affect the usefulness and the subsequent use of the textbook. A novel feature of our paper is the explicit modelling of the learning technology, by considering different learning tools. If a student usually studies on lecture notes rather than on the textbook, her reservation price for the latter is likely to be low and the probability to switch to the illegal market is high³.

Third, another important factor often analyzed in copyright studies is the peer effects. In our perspective, the way mates study influence the usefulness attached to textbooks and the attitude of individuals towards the copyright, directly and indirectly.

Following this framework, the paper analyses the decision of the university students to rely on the legal or illegal textbook market, by using a unique data set based on about 14,000 answers to an on-line questionnaire filled in 2010 by the students enrolled at the University of Bologna, Italy.

The structure of the paper is the following. In section 2 we describe the dataset and provide some descriptive statistics of the variables. In section 3 we develop an ordered probit and discuss the resulting empirical evidence. In section 4 some policy implications are briefly sketched and section 5 concludes.

2. Structure of the dataset

In Italy, the illegal reproduction of textbooks is widespread, even if reliable data on the size of this market are difficult to collect. Fresh evidence on the illegal reproduction behavior of university textbooks can be drawn from our data set based on an on-line survey conducted among the students of the University of Bologna, in the period May-July 2010⁴.

Every student enrolled in the academic year 2009-10 received an e-mail invitation to fill in the questionnaire⁵. Two successive reminders were sent via e-mail after one and two weeks,

² The mechanisms of the individual skill formation, particularly in the early stages of the life cycle, has been studied by Cunha and Heckman (2007). We focus on the cognitive skill accumulation technology by the university students.

³ The teaching technology, the other crucial factor that determines the outcome of the learning process, has been extensively scrutinized in the literature. Among others, De Paola and Scoppa (2011) and Schwedt and Wuppemann (2011) analyzed the effects of different styles of teaching. Quite curiously, in the literature, the learning and teaching technologies tend to be analyzed separately.

⁴ Exploratory estimates of the Italian Publishers' Association suggest that, at national level, the sizes of the legal and illegal markets are similar. In Italy, as in other countries, up to 15% of a book can be legally photocopied. However, the legal copying segment is of minor importance: in our sample in less than 4% of the cases the textbook is used up to the 25% of its content. Moreover, also in these cases the copies are illegal.

⁵ A preliminary version of the questionnaire was submitted to a pilot group of students. Only minor modifications were introduced in the final version.

respectively, in order to increase the number of respondents. The collection of data ended in July 2010.

Each student was asked to provide information about his/her socio-demographic, educational and cultural characteristics (age, gender, working status, education of the parents, reading habits, year and faculty of enrollment), to describe the learning practices adopted (the learning tools mainly used), the strategies implemented to prepare the last two exams⁶, and the study habits of mates. Students could not fill in the questionnaire twice and the design of the survey assured anonymity, in order to avoid strategic responses.

We collected information from 13,808 students, the 16.40% of all the students enrolled at the University of Bologna in that academic year. Even if the sample derives from a voluntary participation of the student to the survey, rather than from a preordered sampling design, its structure turns out quite similar to the population. In fact, the students belonging to the social science group (to be defined more precisely below) are 39.49% in the sample and 38.09% in the population, the humanities students are respectively 23.04% and 21.96%, the technology and applied science group students are 17.90% and 17.08%, the math, physics and life sciences students are 10.01% and 7.94%, and, finally, the Medical, Pharmacy and Veterinary Science students are 12.56% and 14.92%, respectively. These slight discrepancies are in part due to the lower propensity to answer of males (39.38% of respondents were males, against 43,70% of the population).

2.1 Photocopies and new textbooks.

Even if students often use a wide range of learning tools, including lecture and teacher notes, our interest is focused on whether (and eventually how much) illegally copied and newly purchased textbooks have been used to prepare the last two exams.

As the use of photocopies does not prevent, a priori, the use of newly purchased books, respondents were asked to assess the importance in passing exams of photocopied and newly purchased textbooks using a 4-grade Likert scale, from very low to very high. In fact, lecturers often adopt more than one textbook for each course, possibly integrated with other tools (lecturers handouts, lecture notes, journal articles and “grey” materials). In Table 1 we assess the importance given by the students to photocopies and textbooks in passing the exams (assigning low importance for grades 1 or 2 of the Likert scale and high importance for grades 3 or 4). Overall, the size of the low and high importance subgroups is roughly the same for both the copies and texts markets, even

⁶ This allows us to shed some light on the persistence of the students' learning process. The empirical evidence suggests the existence of an individual- rather than exam-specific learning tool effect, with a student developing habits to study, that tend to remain constant throughout the academic career.

if the weights change between the Social Science and the Humanities and the other subgroups of students.

The Spearman correlation coefficient between the Likert grades series of the textbook and photocopies market is negative and significant, but its value (-0.20) suggests only a moderate substitutability between copies and textbooks. The correlation within subgroups of respondents, however, varies: negative and large for Social Science and Humanities students, that rely more on textbooks, in both versions; smaller for Technology and Applied Sciences, Mathematics and Physics, Medical and Veterinary Science students, that rely more on lecture and teacher's notes⁷.

Table 1 – Importance of photocopies and new textbooks

	Photocopies		New textbooks		Spearman corr coeff. between photocopies and new textbooks
	Low importance share	High importance share	Low importance share	High importance share	
Whole sample	49.49%	50.51%	52.78%	47.22%	-0.20
Social Sciences and Law	44.76%	55.24%	45.03%	54.97%	-0.41
Humanities, Educ., Lang.	40.69%	59.31%	45.30%	54.70%	-0.06
Tech and App. Sciences	60.24%	39.76%	67.22%	32.78%	-0.07
Math., Physics and Life Sci.	57.65%	42.35%	68.48%	31.52%	-0.21
Medical. Pharm. and Vet.	57.56%	42.44%	56.20%	43.80%	-0.14
Freshmen	48.68%	51.32%	49.74%	50.26%	-0.22
Core exam	50.02%	49.98%	49.51%	50.49%	-0.10
Males	55.55%	44.45%	54.32%	45.68%	-0.15

Note: In the Photocopies and New Textbook samples the case of low (high) importance in passing the exams corresponds to grades 1 and 2 (3 and 4) in the Likert scale.

2.2 Control variables

The survey provides information on students socio-economic characteristic but not about the disposable income of the student and/or of her family⁸. The complete list of variables is in Appendix A. We collected information about the price of the last new textbooks bought and of illegal copies but, given the low response rate and the inaccurate reported values, we do not use this piece of information - a surprising result as many respondents, in an open field of the questionnaire, complained about the high price of textbooks, which often “forced” them to use illegal copies, being fully aware of the copyright infringements.

Detailed information is available about the students cultural, individual and socio-demographic characteristics (age, gender, nationality, region of origin, parents' education grade, professional status, residence, size of the family library), education performance and cultural attitudes (non-academic reading habits, type of secondary education and graduation marks) as well as about study

⁷ In Table 1 the low (high) and very low (high) grades are aggregated, given the strong polarization of results into the extreme grades.

⁸ The questions about income or similar variables reduce significantly the number of respondents.

practices and habits (ways of preparing exams, importance of different learning tools, importance of group study, degree of lecture attendance, etc.).

The survey covered also other aspects of the students academic experience - the faculty of enrolment, the number of years of enrolment and the number of passed exams.

As shown in Table 2, given the large number of faculties considered, we grouped them in five large study fields (Social Sciences; Mathematics, Physics and Natural Sciences; Technical and Applied Sciences; Humanities and Classical studies; and Medicine, Pharmacy and Veterinary). Social Sciences (36.49%) and Humanities (23.04%) are largest groups of the respondents.

Table 2 – Data set descriptive statistics

Students (%), by study field		Students (%), by nation and region of origin	
	Percent		Percent
Social Sciences and Law	36.49%	North Italy	63.95%
Humanities, Educ., Lang.	17.90%	Centre Italy	7.76%
Tech and App. Sciences	10.01%	South Italy	18.67%
Math., Physics and Life Sci.	23.04%	Italian islands	5.14%
Medical, Pharm. and Vet	12.56%	Foreign students	4.38%
		N.A.	0.10%

Students (%), by residence		Students (%), by working status	
	Percent		Percent
Off-site students	42.86%	Non-workers	50.69%
Commuters (within province)	23.43%	Tempor./occasional workers	36.75%
Commuters (outside province)	14.85%	Full time worker	12.56%
Local students	18.86%		

Students (%), by degree of education of the parents		
	Father	Mother
primary school (or less)	7.71%	7.08%
1st grade secondary school	25.89%	22.60%
2nd grade secondary school	41.53%	46.71%

In the academic career of a student, knowledge is transmitted and accumulated through ex cathedra lectures or through practice (laboratories, etc.). The foundations of a discipline are studied in “core” exams, whereas non-core exams often cover more “liquid” topics⁹. In the former cases, textbooks are likely to be useful also in the future, and are therefore more valuable. For this reason, we distinguish between exams which the student herself considers core or non-core, as the decision to invest time and money in an exam and the decision to rely upon the legal or illegal market might differ in the two cases.

⁹ Core exams are therefore more likely set in the first and second year of the course.

Also the type of exam – written, oral or written and oral - can be important, as the study approach adopted by the student can change, possibly inducing a change also in the propensity to use textbooks in the legal and/or illegal versions.

A further noteworthy characteristic of the dataset concerns the region of origin of respondents. In Italy only few universities, Bologna among them, attract students from other Italian regions and from abroad. In fact, only the 55.15% of respondents reside in Emilia-Romagna, the region where the university is located. Table 2 shows that even if most of the students come from Emilia-Romagna and others Northern regions, a sizable share (about 28%) is from far areas.

Local residents, commuters and off-site students face different time and budget constraints and tend to develop specific paths of relational capital accumulation. A commuter that shares her daily journey with other commuters is more likely to interact with them, rather than with a resident student. Off-sites students sharing the same flat or living in the same area are more likely to be friends and to study in groups. Hence, different groups of students tend to develop different lifestyles and learning practices. The corresponding classification divides respondents in off-site students, commuters from outside the province where their Faculty is located, commuters within the province and local residents in the same city where the Faculty is located. As shown in Table 2, about 40% of respondents are commuters and only 19% are local residents. Off-site students constitute a large (and possibly overrepresented) share of the sample (42.86%).

Also the working status of the student can influence her attitude towards copyright. On the one hand, students who work might experience a relaxation of their budget constraint with respect to students relying on external family subsidies. On the other hand, the time they can devote to study can be severely constrained. Students that work, particularly full-time workers, are less likely to attend lectures and are more likely to study on textbooks and on notes, if available. For this reason, we distinguish between full time students (50.69% of the sample), part-time and seasonal workers (36.75%) and full-time workers (12.56%).¹⁰

In our dataset, we collect information about the education degree of parents, the size of their home libraries and students' attitude to read (non-academic) books. As shown in Table 2, secondary school and university degrees are more frequent among mothers and fathers, respectively. In the literature, it is widely known that these variables shape students' cultural background and influence their educational outcome¹¹. Similar effects are also expected to emerge in the choice between the

¹⁰ Technical and science faculties have the largest share of non-worker students. The share of temporary worker students is relatively high for Humanities and Social science. Most of the students enrolled in bachelor degrees and in two-year master programs do not work. Unsurprisingly, the share of working students increases with age.

¹¹ In the sample the correlation between the high school final marks of the student and the level of education of the parents is positive and statistically significant at the 10% level.

legal and illegal textbook markets, as they define, in a broad sense, the cultural capital of the student.

Simple descriptive statistics suggest that university students with a high secondary school final graduation mark tend to rely less upon the illegal textbook market, even if they do not buy more new textbooks. Students who obtained a high grade in secondary school use less textbooks in both versions (the Spearman correlation coefficient between the final grade and the degree of use of the textbook is -0.039 and -0.067, for the new and copied version, respectively) and more handouts and lecture notes (0.048 and 0.111, respectively)¹².

In general, while freshmen might not be fully aware of the cultural value of textbooks, senior students (especially in the case of the 2-year specialization degree) could be more conscious about this point. For these reasons, we include as control variables the number of exams passed each year, the year of university enrolment (first, second,...), and the type of degree (3-year bachelor degree, 2-year specialization course,...).¹³

“Pure” age effects might be unimportant in shaping students’ legal or illegal behaviour, since “learning by studying” effects are more likely to be influenced by the above mentioned variables, the lectures attendance, working status of the students and behaviour of the mates¹⁴. Non significant variables will be excluded from the final specification of the empirical model.

Also a persistence effect in the learning technology could emerge, as studying is a difficult activity that leads students to develop their own knowledge accumulation process. Over time, this learning by doing mechanism makes more and more difficult for a student to change her habits. As time goes by, students become more familiar with, and use more efficiently, a given subset of learning tools and are unlikely to switch to other learning technique.

This persistence in the learning process holds also in terms of persistence in the use of different versions of textbooks: in Table 3 we show that for 7 students out of 10, the degree of use of the photocopies and of the new textbook remains constant over the last and second to last exams¹⁵. Among the students that exhibit a persistent behavior, the largest are the groups with the lowest and highest use in both copies and text.

¹² Obviously, simple correlations do not take into account the effect of several unobservable characteristics, e.g. students with higher final secondary school marks are less likely to enroll in Social Science and Humanities fields.

¹³ In the data set the number of passed exams is collected by intervals. The number of exams per year is approximated by the central value of the interval, and normalized by the number of years of enrolment. As the types of degrees is concerned, Italy has adopted the so-called Bologna process, with a 3-year bachelor degree course and a 2-year specialization course. In some cases, like in the Medical Faculty, there are 5-year “European” degrees.

¹⁴ The same results emerge when nationality is considered: domestic and foreign students’ behavior does not differ.

¹⁵ The intensity of the persistence effect is roughly the same in the whole sample and in the high peer effect sub-sample.

Table 3 – Persistence in the intensity of use in the illegal and legal textbook markets

students	Whole sample	
	Photocopies	New textbooks
that report information upon two exams	11,012	11,883
that exhibit persistence	8,046	8,459
students that exhibit persistence	0.73%	0.71%
Of which:		
1 Lowest use	0.49%	0.57%
2 Low use	0.03%	0.02%
3 High use	0.18%	0.10%
4 Highest use	0.30%	0.31%

Note: a student exhibits persistence if, using a 4-degree Likert scale, maintains the same intensity in the use of photocopies or of newly purchased textbooks in the last and second to last exams.

We finally consider the influence exerted by the peers of the student. Each student knowledge accumulation process often goes hand in hand with the formation of her relational capital, including the interactions with mates. Through the common knowledge of the class, the topics deemed particularly relevant in order to pass an exam are more efficiently selected and studied. At the individual level, the uncertainty about any exam is reduced if the student does what the others do. The peer effect, in particular, might be particularly important in “practical” fields (engineering, medicine, life and natural sciences, etc.), where an individualistic approach to the accumulation of knowledge tends to be more risky and less efficient than in fields, like humanities, which require a reflexive and possibly original study. For this reason, in the questionnaire we also investigate the learning practices of the peers as well the importance of studying with the mates (Table 4).

Table 4 – Descriptive statistics on learning practices

Mates learning tools (%)		Percent		Mates learning tools (%)		Percent		
Textbook only		19.84		Photocopies only		6.45		
Also photocopies but mainly on textbooks		18.18		Lecture notes		63.61		
Also textbooks but mainly on photocopies		36.01		Teacher notes		37.75		
Use of some learning tools and practices in order to pass the exams								
	Attend lectures	Study with mates	Meet professors in office hours	Study on lecture notes	Study on teacher notes	Study on (new or copied) textbooks	Study on additional text/essays	Study on the Internet
Non useful	2.52	17.00	23.70	2.49	1.57	2.33	14.05	12.83
A little useful	5.95	22.66	27.81	6.14	3.68	4.72	24.59	22.56
Quite useful	19.58	27.6	27.45	16.92	15.17	16.11	30.66	30.70
A lot useful	36.18	20.95	14.28	31.54	36.52	32.23	20.67	22.09
Extremely useful	35.77	11.80	6.760	42.90	43.06	44.61	10.03	11.82

3. Econometric approach.

A student often uses contemporaneously several learning tools, some legal and others not, as illegal photocopies. Hence, her attitude towards the copyright is better described by explicitly

assessing the purchase of new textbooks and of illegal copies, each effect measured through a four-grade Likert scale. Each dependent variable is regressed against a series of covariates describing the individual and family characteristics of the student, the type of university course she attends and some characteristics of the last two passed exams. Some of these regressors are quite standard in the analysis of the performance of university students; however, we consider also the impact of the learning technique of the student, and of the way her mates study. This augmented model allows us to shed some light on the effects exerted on the copyright law by students' relational environment and learning processes.

3.1 Ordered probit regressions

We estimate two ordered probit regressions, one for the legal textbook market and one for the illegal market. Indicating with LM the individual use of the legal market on the four Likert scale and with IM the corresponding variable for the illegal market, we regress LM and IM on a constant and a series of covariates: with the X1 group we measure the family and personal characteristics of the student (education degree of her parents and reading habits). Some of the X1 variables (field of study and life-style) are intertwined with the learning technology variables, X2, which measure the usefulness of the several learning tools considered in the questionnaire. The third group, X3, describes the way peers study. The estimated model is therefore:

$$\begin{aligned} LM_i &= \alpha^{LM} + \sum_j \beta_j^{LM} X1_{ij} + \sum_j \phi_j^{LM} X2_{ij} + \sum_j \varphi_j^{LM} X3_{ij} + u_i^{LM} \\ IM_i &= \alpha^{IM} + \sum_j \beta_j^{IM} X1_{ij} + \sum_j \phi_j^{IM} X2_{ij} + \sum_j \varphi_j^{IM} X3_{ij} + u_i^{IM} \end{aligned}$$

where $i=1, \dots, N$ is the number of individual observations. As most students provided information on the last and the penultimate exams, the number of observations is almost twice than the number of respondents. In the estimation, heteroskedasticity robust standard errors have been computed in order to take into account this feature of the sample. The two ordered probit regressions are estimated separately, under the maintained hypothesis of zero correlation ($\rho=0$) between the error terms; however, we will also consider the case of a bivariate probit regression and explicitly test for $\rho=0$ (Section 3.2).

The baseline case considered in both the regressions is that of a female Italian student, non-resident in the municipality in which her Faculty is located. She is enrolled in a 3-year bachelor degree, attends few lectures and has passed less than five exams.

In a frictionless situation, similar groups of selfish, risk neutral, autonomous, and equally informed individuals are likely to exhibit an analogous degree of use of the legal (illegal) market.

However, because students are heterogeneous in terms of preferences (in terms of risk aversion, and family and cultural background), learning processes and peers influence, the attitudes towards the two markets remain dispersed.

In Table 5 we show that the students enrolled in Social Science and Humanities faculties use textbooks more intensively, particularly in the illegal version; the students of the other fields are instead more likely to use tools like lecture and teacher notes.

Males tend to illegally copy textbooks less than females, *ceteris paribus*, but, because of the relatively low degree of substitution between the new and photocopied textbooks, for males there is only a weak positive effect on the propensity to use the legal textbook; also in this case, these students are likely to use more intensively other learning tools like lecture notes.

The distinction between residents, non-local residents and commuters affects the decision to use the legal or the illegal textbook version. Indeed, proximate commuters and residents copy less textbooks than outside province commuters and non-residents. This latter group, moreover, has a low propensity to purchase new textbooks. A possible explanation is that living costs for non-local residents are significantly higher, and therefore they are more likely to cut other costs, the purchase of new textbooks among them.

Temporary workers use more illegal copies and less newly purchased textbooks, possibly because this group is more likely to face stricter budget constraints than the full-time workers, who purchase more new textbooks, even if this has no effect on the use of illegal copies.

Also the type of academic degree influences students copyright attitude. Taking the 3-year bachelor degree as the baseline case, in Table 5 we show that the students enrolled in the 2-year specialization degree use less textbooks, in both versions (and possibly more lecture notes and other learning tools). On the other hand, for the students enrolled in a 5-year European degree (belonging mainly to the Medical Faculty) the illegal and the legal versions of the textbook are substitutes, and they study mainly on the latter version.

Even the lecture attendance increases the use of copied textbooks and lowers the use of new textbooks, possibly because who attends lectures is better informed about the most important parts of the syllabus and uses (and copies) only these parts.

The number of years of enrolment exerts a weak effect, possibly because the “learning by doing” effects are better proxied by variables (like the field of study, the type of degree, and the attendance to lectures); anyway, more experienced students tend to purchase more new textbooks and less illegal copies, even if repentant students buy less textbooks, particularly in the legal version.

The past performance of the students is summarized by their secondary school final examination mark and by the average number of passed exams per year. A higher mark is associated to a lower propensity to use illegally copied textbooks, whereas the propensity to use new textbooks is not affected. On the other hand, the larger the number of passed exams per year, the lower the propensity to use legal textbooks, whereas the intensity in the use of the illegal market is unaffected.

More educated mothers do not exert any significant effect, whereas more educated fathers tend to increase the probability to purchase new textbooks. Strong individual reading habits reduce the weight of the photocopied textbooks, whereas strong family reading habits (measured in terms of home library size)¹⁷ induce the student to purchase more new textbooks. Being a strong reader does not influence the purchase of textbooks, while having a large library does not influence the use of illegal copies.

Whereas the way a student uses the learning tools being the outcome of a learning by doing process is unlikely to change dramatically over time, it is nevertheless affected by some specific characteristics of the exam¹⁸. The data set comprises thousands of different courses, and it would be very difficult to model appropriately each single exam. We simplify the problem by distinguishing between core and non-core examinations of a program of study¹⁹. We expect that, for core exams, students are willing to spend more time, effort and money. The empirical evidence shows that in this latter case students rely upon new textbooks rather than on photocopies²⁰. In this respect, legal and illegal textbooks are “substitutes”, as the relevant coefficients have opposite signs in the two regressions.

¹⁷ This variable might be considered also a proxy for the family income. See also Brunello *et al.* (2012).

¹⁸ Exams differ in terms of importance and perceived level of difficulty because of the subject, quality of lectures, and several other characteristics. Obviously, the same topic could require different skills and effort because of the teachers' idiosyncrasies. However, the teaching technique issue is not addressed in this paper.

¹⁹ The core/non core classification is done directly by the students.

²⁰ The likely future re-use of core exam textbooks for academic or professional reasons fosters the purchase of new books over low quality alternatives.

Table 5 - Use of the legal or illegal textbooks markets - ordered probit regressions

Dependent variable	use of the legal or illegal textbooks markets - 4-degree Likert scale			
	Photocopies		New textbooks	
Number of obs	13,403		14,241	
Wald chi2(46)	882.24 [0.000]		1,670.82 [0.000]	
Pseudo R2	0.0438		0.0856	
Log pseudolikelihood	-15116.71		-14283.51	
	Coef.	P> z	Coef.	P> z
Tech and Appl Sci	-0.234	0.000	-0.426	0.000
Math, Phys and Nat Sci	-0.264	0.000	-0.598	0.000
Humanities	0.076	0.032	-0.096	0.006
Med, Vet and Pharm	-0.214	0.000	-0.398	0.000
Males	-0.179	0.000	0.048	0.075
Foreign student	0.034	0.675	-0.138	0.100
Commuter outside province	0.001	0.970	0.134	0.000
Commuter within province	-0.138	0.000	0.145	0.000
Local resident	-0.163	0.000	0.149	0.000
Temporary worker	0.112	0.000	-0.131	0.000
Full time worker	0.031	0.562	0.232	0.000
2-year Specialist degree	-0.092	0.005	-0.257	0.000
5-year European degree	-0.147	0.001	0.220	0.000
Pre-reform 4-y degree	-0.034	0.759	0.262	0.035
Pre-reform diplomas	0.142	0.413	0.017	0.927
Attend lect. [25%-50%]	0.169	0.002	-0.167	0.002
Attend lect. [50%-75%]	0.150	0.002	-0.106	0.030
Attend lect. [75%-100%]	0.133	0.004	-0.186	0.000
2 nd year of enrolment	0.021	0.526	-0.072	0.030
3 rd year of enrolment	-0.059	0.144	-0.158	0.000
4 th year of enrolment	-0.145	0.116	0.000	0.996
5 th year of enrolment	-0.132	0.183	-0.092	0.316
Repetent student	-0.042	0.303	-0.196	0.000
Passed exams per year	0.007	0.329	-0.050	0.000
Secondary school final grade	-0.004	0.000	-0.001	0.257
Father education degree	-0.020	0.261	0.042	0.019
Mother education degree	-0.031	0.101	-0.001	0.939
No. non academic books read in the last year	-0.039	0.009	0.008	0.580
Size of home library	-0.018	0.142	0.058	0.000
Core exam	-0.088	0.000	0.213	0.000
Oral exam	-0.106	0.000	0.213	0.000
Written and oral exam	-0.050	0.088	0.182	0.000
	Usefulness for passing exam:			
Lecture attendance	-0.043	0.010	0.079	0.000
Studying with mates	0.043	0.000	-0.056	0.000
Office hours	-0.005	0.660	0.061	0.000
Lecture notes	0.029	0.082	-0.053	0.001
Teacher notes	0.020	0.237	-0.076	0.000
Textbooks (new or copied)	0.067	0.000	0.162	0.000
Additional books	0.031	0.016	0.032	0.012
Studying on the Internet	0.006	0.599	0.000	0.991
	Mates study on:			
Textbooks only	0.009	0.820	0.301	0.000
Mainly textbooks	0.008	0.833	0.200	0.000
Mainly photocopies	0.326	0.000	-0.035	0.326
Photocopies only	0.625	0.000	-0.373	0.000
Lecture notes	0.003	0.902	-0.037	0.181
Teacher note	-0.051	0.083	-0.110	0.000
		Rob.Std. Err.		Rob. Std. Err.
cut1	-0.282	0.157	0.585	0.158
cut2	-0.153	0.157	0.683	0.158
cut3	0.392	0.157	1.101	0.158

Note 1: as we usually have two observations (referred to the last and second to last exams) from the same student, the standard errors are corrected for 6,923 clusters in the photocopies regression, and for 7,343 clusters in the newly purchased textbooks regression.

Note 2: the usefulness for passing exam variables is measured through a 1-4 Likert scale.

Note 3: the education degree of the parents is measured as follows: 1=primary school degree, 2= lower secondary degree, 3= upper secondary degree and 4 = university degree

Note 4: the secondary school final degree level is measured in cents.

In the regressions, the omitted variable is the written exam dummy. In the case of oral examination, students rely more on the legal rather than on the illegal market, with a stronger propensity to purchase new textbooks and a lower propensity to buy copies. In the case of a written and oral exam, the impact on the purchase of new textbooks is still positive, whereas the negative impact on the illegal copies is weakened.

The perceived importance, in order to pass exams, of attending lectures, studying with mates, asking to the teacher, studying on lecture notes or on the handouts of the teachers, relying mainly on textbooks and on additional books constitutes a crucial set of explanatory variables.

A more assiduous lecture attendance (a “virtuous” practice) increases the purchase of new textbooks and reduces the reliance on copies. Being in touch with the teacher during office hours induces a “virtuous” behaviour, as it increases the use of legal textbooks (but does not reduce significantly the use of photocopies). A more intense study with other mates turns out to be a practice which reduces the use of new textbooks and increases the illegal reproduction of books. The same outcome emerges for the use of lecture notes, and, to a lower extent, for teacher notes. Hence, lecture notes emerge as the real substitute of the textbook, in both versions.

Also the way the peers study is important. When the mates study mainly on textbooks, a direct feedback emerges on the student behaviour, inducing her to purchase textbooks, without any significant indirect effect on the illegal market. If mates study mainly on illegal copies, the individual student imitates this practice and a strong positive direct peer effect emerges. Moreover, there is also an indirect peer effect: if the illegal behaviour of the mates is strong (only photocopies are used), the propensity to buy new textbooks is significantly reduced. If mates rely more on handouts, the purchase of new textbooks is reduced, but the illegal market is unaffected. Instead, a stronger use of lecture notes by mates has no effect on both the legal and illegal textbook markets.

Overall, the empirical evidence suggests that social interactions induce the adoption of imitative behaviors, particularly when ties are strong (students frequently study together). The peer effect is even stronger, and asymmetric, when it concerns opportunistic illegal practices. More precisely, the legal behavior of the peers creates a positive externality, as it increases the propensity of the single student to rely upon the legal market, whereas the illegal behavior of the peers increases the reliance on photocopied textbooks, and also reduces the purchase of new textbooks. “Social norms” therefore emerge as an important element in explaining students’ attitudes towards copyright laws.

3.2 Robustness check.

In order to evaluate the robustness of our previous conclusions we have carried out two additional empirical analyses. Firstly, we identify and analyze the cases of weak and strong peer effects. Secondly, we evaluate the linkages between the legal and illegal textbook markets using a bivariate probit regression.

In the first extension, students are classified on the basis of the importance they attach to studying with their peers. As shown in Table 4, the 39.7% of students do not consider particularly important this practice; the 32.7% holds an opposite view and the 27.7% has an intermediate position. We estimate the two regression models on the two subsamples of low peer effect (grades 1 and 2 of the Likert scale) and strong peer effect (grades 4 and 5). The overall picture emerging from the estimation (Table 6) corroborates the evidence already depicted in Table 5.

The comparison between the regressions in Tables 5 and 6 shows that most of the variables describing the individual characteristics (gender, nationality, residence, working status) are almost always unaffected by the distinction between strong and weak peer effects.

Core and oral exams enhance the legal behavior, independently of the peer effects, but discourage the illegal behavior only when the students attach a low importance to peers.

Some qualifications are required for the variables more closely related to the “subjective” behavior of the student. An increased attendance to lectures for the strong peer effect group increases the use of copies and reduces the purchase of new textbooks.

Possibly because of the smaller sample size, on the illegal market, for the weak peer effect group the influence of the field of study is slightly weakened for humanities and med students. Also the effects of the type of degree and of the lecture attendance tend to lose statistical significance, particularly for the weak peer effect sub-group. Belonging to the strong peer sub-group reduces the impact of the residence of the student and of commuting on both the legal and illegal markets.

The strong peer group, moreover, on the photocopies market, tends to put all exams (core and non-core, written and oral) on the same level, and to disregard any difference in the usefulness of the learning instruments. As for the textbook regression, the purchase of the individual student is reduced if “strong” peers study on lecture notes, and is increased if they study mainly on textbooks.

Table 6 – Use of the legal and illegal textbook markets and the peer effect

Dependent variable	use of the legal or illegal textbooks markets - 4-degree Likert scale							
	Photocopies				Newly purchased textbooks			
	Strong peer effect		Weak peer effect		Strong peer effect		Weak peer effect	
Log pseudolikelihood	-4962.18		-5,787.51		-4537.55		-5668.78	
Pseudo R2	0.051		0.048		0.095		0.078	
Number of obs	4466		5192		4690		5578	
Wald chi2(46)	347.570		372.980		603.670		613.220	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Tech and Appl Sci	-0.275	0.000	-0.360	0.000	-0.538	0.000	-0.411	0.000
Math, Phys and Nat Sci	-0.258	0.001	-0.324	0.000	-0.755	0.000	-0.644	0.000
Humanities	0.137	0.047	0.036	0.496	-0.198	0.004	-0.115	0.030
Med, Vet and Pharm	-0.283	0.001	-0.115	0.146	-0.453	0.000	-0.442	0.000
Males	-0.150	0.002	-0.206	0.000	0.082	0.088	0.057	0.183
Foreign student	0.223	0.127	-0.133	0.330	-0.284	0.055	-0.081	0.540
Commuter outside province	0.096	0.102	-0.004	0.944	0.123	0.044	0.096	0.066
Commuter within province	-0.072	0.300	-0.138	0.027	0.133	0.050	0.139	0.021
Local resident	-0.139	0.021	-0.193	0.002	0.099	0.100	0.198	0.001
Temporary worker	0.185	0.000	0.078	0.085	-0.144	0.004	-0.116	0.011
Full time worker	-0.014	0.885	0.067	0.384	0.181	0.060	0.253	0.001
2-year Specialist degree	-0.196	0.001	-0.027	0.611	-0.235	0.000	-0.273	0.000
5-year European degree	-0.112	0.136	-0.125	0.100	0.168	0.024	0.171	0.016
Pre-reform 4-y degree	-0.090	0.646	0.105	0.599	0.360	0.091	0.212	0.271
Pre-reform diplomas	0.471	0.150	0.361	0.153	0.653	0.129	-0.084	0.714
Attend lect. [25%-50%]	0.225	0.028	0.095	0.251	-0.181	0.079	-0.102	0.212
Attend lect. [50%-75%]	0.213	0.016	0.114	0.124	-0.168	0.062	-0.047	0.529
Attend lect. [75%-100%]	0.154	0.067	0.156	0.027	-0.221	0.010	-0.100	0.156
2 nd year of enrolment	0.082	0.177	0.032	0.548	-0.092	0.130	-0.057	0.281
3 rd year of enrolment	-0.054	0.455	-0.073	0.259	-0.193	0.007	-0.031	0.613
4 th year of enrolment	-0.068	0.631	-0.181	0.249	0.040	0.757	-0.052	0.718
5 th year of enrolment	0.129	0.413	-0.271	0.085	-0.302	0.047	0.021	0.891
Repetent student	0.055	0.439	-0.124	0.063	-0.203	0.004	-0.221	0.001
Passed exams per year	-0.001	0.949	0.005	0.691	-0.049	0.001	-0.063	0.000
Secondary school final grade	-0.006	0.002	-0.002	0.298	-0.002	0.325	0.000	0.917
Father education degree	0.026	0.420	-0.020	0.489	0.061	0.057	0.055	0.056
Mother education degree	-0.038	0.257	-0.033	0.289	-0.038	0.246	0.005	0.862
No. non academic books read in the last year	-0.043	0.118	-0.043	0.069	0.016	0.551	0.025	0.267
Size of home library	-0.025	0.227	-0.026	0.179	0.062	0.003	0.057	0.002
Core exam	-0.043	0.281	-0.133	0.000	0.255	0.000	0.162	0.000
Oral exam	-0.085	0.083	-0.132	0.003	0.270	0.000	0.226	0.000
Written and oral exam	-0.008	0.878	-0.051	0.306	0.258	0.000	0.153	0.002
Usefulness for passing exam								
Lecture attendance	0.011	0.725	-0.062	0.018	0.081	0.006	0.085	0.001
Studying with mates	0.028	0.557	0.047	0.270	-0.015	0.749	-0.122	0.003
Office hours	-0.022	0.303	-0.025	0.240	0.054	0.009	0.082	0.000
Lecture notes	0.018	0.540	0.054	0.035	-0.024	0.429	-0.081	0.001
Teacher notes	0.013	0.672	0.007	0.786	-0.027	0.377	-0.111	0.000
Textbooks (new or copied)	0.046	0.065	0.049	0.046	0.174	0.000	0.141	0.000
Additional books	0.041	0.081	0.047	0.013	-0.004	0.878	0.049	0.011
Studying on the Internet	-0.006	0.780	0.002	0.905	0.005	0.803	0.008	0.665
Mates study on:								
Textbooks only	-0.029	0.687	0.021	0.764	0.311	0.000	0.204	0.002
Mainly textbooks	-0.064	0.358	0.004	0.949	0.247	0.000	0.104	0.133
Mainly photocopies	0.294	0.000	0.371	0.000	-0.024	0.689	-0.068	0.257
Photocopies only	0.701	0.000	0.620	0.000	-0.467	0.000	-0.355	0.000
Lecture notes	0.032	0.513	-0.037	0.406	-0.125	0.014	0.020	0.654
Teacher note	-0.063	0.211	-0.042	0.381	-0.116	0.023	-0.101	0.039
cut1	-0.262	0.339	-0.306	0.250	0.842	0.344	0.462	0.249
cut2	-0.147	0.339	-0.176	0.249	0.947	0.344	0.551	0.249
cut3	0.446	0.339	0.328	0.250	1.386	0.344	0.939	0.249

Note 1: see notes 2-4 of Table 5

Note 2: as we usually have two observations (referred to the last and second to last exams) from the same student, the standard errors are corrected for 2,292 clusters in the strong peer effect photocopy regression, for 2,689 clusters in the weak peer effect regression.

The role the student attaches to the various learning tools (copied or original textbooks, lecture notes, handouts,...) is often not statistically significant in both the regressions for the strong peers effect group.

The “do what the others do” effect emerges, independently of the peer effects, in the last rows of Table 6. As already shown in Table 5, if mates study on copies (or on new books), the individual student is more inclined to do the same (direct peer effect); the size of the coefficients increases as the peer effect is strong and the behavior of the peer group is extreme (only photocopies or only new books).

As for the purchase of textbooks, Social Science and Humanities students buy more books than others. Residents and proximate commuters buy more books, but only when the peer effect is weak. Full-time worker students always buy more books, if the peer effect is weak. An assiduous lecture attendance reduces the propensity to copy textbooks, only for the strong peer effect group. Reading books for pleasure does not affect the propensity to buy textbooks; a large home library increases the probability to purchase new textbooks or photocopies, as in Table 5.

For the strong peer effect group, increasing attendance to lecture, relying on the office hours of the teacher, and studying on books, all positively affect the propensity to use legal textbooks. For the weak peer effect group, studying with mates, using handouts and lecture notes reduce the propensity to purchase new books.

The rationale of our second robustness check is the observation that even if the legal and illegal textbook markets are not one the reverse of the other, it might well be the case that the two regressions share a common unobservable shock. In this case an appropriate method of estimation is the bivariate probit model. We estimate this model by collapsing the 4-grade Likert scale into a simpler two grade low-high degree in use of the legal and illegal markets. Whereas the estimated variance-covariance matrix for this two equations model is not diagonal, as shown by the values of correlation coefficients in Table 7, the SUR estimation returns a picture close to the one shown in Table 5, with coefficients of analogous signs and sizes, with minor differences in effect of the year of enrolment of the student.

Table 7 – Use of the legal and illegal textbook markets - Bivariate probit regressions.

	use of legal or illegal textbooks market - 4-degree Likert scale			
Dependent variable				
Log pseudolikelihood	-16114.84			
N obs	12859			
Wald chi2(92) [Prob > χ^2]	1708.69 [0.000]			
Athrho	-0.310 [0.000]			
ρ	-0.301			
Wald test of $\rho=0$ [Prob > $\chi^2(1)$]	289.957 [0.000]			
	Photocopies		New textbooks	
	Coeff.	P>z	Coeff.	P>z
Constant	0.590	0.001	-0.630	0.000
Tech and Appl Sci	-0.200	0.000	-0.377	0.000
Math, Phys and Nat Sci	-0.211	0.000	-0.555	0.000
Humanities	0.110	0.006	-0.032	0.434
Med, Vet and Pharm	-0.181	0.001	-0.328	0.000
Males	-0.139	0.000	0.072	0.020
Foreign student	-0.016	0.857	-0.223	0.019
Commuter outside province	0.018	0.625	0.139	0.000
Commuter within province	-0.123	0.004	0.155	0.000
Local resident	-0.116	0.004	0.147	0.000
Temporary worker	0.114	0.000	-0.129	0.000
Full time worker	0.020	0.744	0.184	0.002
2-year Specialist degree	-0.070	0.058	-0.249	0.000
5-year European degree	-0.139	0.007	0.214	0.000
Pre-reform 4-y degree	0.022	0.865	0.053	0.699
Pre-reform diplomas	0.267	0.198	0.111	0.588
Attend lect. [25%-50%]	0.154	0.014	-0.159	0.011
Attend lect. [50%-75%]	0.154	0.006	-0.053	0.346
Attend lect. [75%-100%]	0.113	0.034	-0.176	0.001
2 nd year of enrolment	-0.016	0.663	-0.061	0.106
3 rd year of enrolment	-0.070	0.127	-0.117	0.010
4 th year of enrolment	-0.097	0.353	0.016	0.878
5 th year of enrolment	-0.110	0.329	-0.273	0.009
Repetent student	-0.088	0.053	-0.231	0.000
Passed exams per year	0.005	0.547	-0.057	0.000
Secondary school final grade	-0.006	0.000	0.000	0.980
Father education degree	-0.013	0.528	0.052	0.012
Mother education degree	-0.032	0.135	0.006	0.767
No. non academic books read in the last year	-0.032	0.061	0.009	0.607
Size of home library	-0.034	0.012	0.035	0.010
Core exam	-0.080	0.002	0.215	0.000
Oral exam	-0.100	0.001	0.201	0.000
Written and oral exam	-0.018	0.577	0.203	0.000
	Usefulness for passing exam:			
Lecture attendance	-0.041	0.027	0.059	0.001
Studying with mates	0.043	0.000	-0.050	0.000
Office hours	0.012	0.391	0.063	0.000
Lecture notes	0.030	0.098	-0.027	0.145
Teacher notes	0.013	0.479	-0.079	0.000
Textbooks (new or copied)	0.013	0.439	0.113	0.000
Additional books	0.043	0.002	0.038	0.008
Studying on the Internet	0.008	0.540	0.010	0.461
	Mates study on:			
Textbooks only	0.006	0.890	0.285	0.000
Mainly textbooks	0.005	0.908	0.254	0.000
Mainly photocopies	0.331	0.000	0.021	0.590
Photocopies only	0.548	0.000	-0.435	0.000
Lecture notes	-0.012	0.695	-0.064	0.044
Teacher note	-0.042	0.206	-0.121	0.000

Note 1: see notes 2-4 of Table 5

Note 2: as we usually have two observations (referred to the last and second to last exams) from the same student, the standard errors in the whole sample bivariate regressions are corrected for 6,611 clusters, in the strong peer effect bivariate regressions for 2,196 clusters and in the weak peer effect bivariate regressions for 3031 clusters.

4. Some implications for copyright policy

Nowadays, making an illegal copy of books or of other media is simple and inexpensive. Technological and behavioral changes have changed the structure of the media industry, as witnessed by the music and the video cases. A similar issue, but with specific features, emerges in the case of the illegal copying of academic journals, in which the monetary and non-monetary rewards of the author are intertwined with the ownership design²¹. Analogous problems arise in the university textbook market, as textbooks can be quickly and cheaply copied. Even more importantly, it is now often disputed the central position of textbooks as main learning tool.

The first reaction of the media content suppliers has been to ask for a stronger legal protection, a pure repressive approach which has proven to be ineffective, as the costs of law enforcement are high (and possibly increasing) with billions of Internet users. In this scenario, it makes sense only to contrast the “wholesale” level of the illegal copy industry.

More effective policies aimed at counteracting copyright infringements consist in the development and implementation of product differentiation strategies²², sometimes driven by technical achievements (e.g. the entry in new markets, like the legal and profitable iTunes type downloads²³) and in the adoption of less ideological approaches in the rights management, allowing for the partial reproduction of textbooks, and/or for digital rights, like those developed for the on-line version of some academic journals.

A sensible policy should make it clear that some types of illegal behaviors (plain photocopying or downloading) in the long run will reduce the welfare of the consumers. Moreover, and perhaps more crucially, it makes sense for students and publishers to enter into a virtuous exchange. At the very heart of the copyright problem, in fact, there is not a legal problem (with the connected enforcement and punishment issues) or a technological issue (with the increasing availability of illegal copies due to the digitalization of the contents) but a cultural issue - the recognition that the cultural value of the content implies a market value of the content itself.

Children (and adults as well) read because they want to (van Ours, 2006); in the same vein, students should choose to pay textbooks because they want to, not because they have to: they can be induced to prefer the legal market, if they recognize the cultural and economic value of textbooks, and the fairness of the market price, in a sort of mutual gift exchange with the authors and publishers (Akerlof, 1982). However, the compulsory reading of a textbook might be at variance

²¹ In the unsettled debate on the copyright on scientific publishing, initiated by Leibowitz (1985), Shavell (2010) supports the abolition of the right. On the distinction between authorship and ownership, cf. Springman et al. (2012).

²² On the music market, for example, a live performance has no close substitute.

²³ iTunes sales allow for a significant degree of market power over each single tune, that does not extend to the sale of a whole CD with a dozen of songs.

with such an idyllic picture. If studying is instrumental to passing exams²⁴, reading a textbook is not always a pleasure, as in the case of a novel or an essay - with the option to give it up if it is not appreciated enough. For this reason, students find it difficult to recognize the value of the textbook, and tend to choose an illegal purchase.

Previous studies have convincingly shown that the attitude towards copyright depends upon individual and family characteristics. Our survey suggests that in the textbook market are relevant also other dimensions. Nowadays, among the several learning tools available to the student, complex relationships of substitutability or complementarity can emerge. The textbook is one of these tools, and not necessarily the most important one. The choice to use one tool or another depends upon the characteristics of the individual, on the subject studied, but also on the acquired learning process, and on the behavior of the peers. Therefore, any sensible policy aimed at reducing copyright law infringements has to take into account social interactions. A mechanism of collective purchase (possibly at discount prices) of textbooks at the University level (or at the class level) might help to overcome some of the previous difficulties.

5. Conclusions

The attitude of a university student to have a legal behavior, by buying new textbooks, or an illegal behavior, by using photocopies of the textbooks, is only in part driven by a simple individual evaluation of monetary costs and benefits, corrected for the different qualities of the legal and illegal versions of the learning tools. The attitude towards the copyright law is the outcome of a complex process influenced by the cultural value the students attach to textbooks and by the learning technologies developed in order to pass exams. In the education economics perspective, the former factor is sometimes overlooked, whereas in the cultural economic perspective, it is the latter factor which tends to be neglected.

In this paper we have analyzed why and how students use the legal and illegal markets by modelling their behaviour on both markets, closely related but each with distinct features. The unobservable cultural value attached to textbooks is influenced by the individual and family characteristics of the students, by the learning technology and habits acquired and by the behavior of the peers. The empirical evidence suggests that all these aspects are important in explaining students' legal/illegal behavior. As social norms and individual and group habits shape the choices of the students, it is not surprising the weakness of the copyright rules that insist on a simplistic individual cost-benefit analysis.

²⁴ The effort directed to a general cultural accumulation process (not exam specific) does not coincide with the study aimed at passing exams. See Liu and Neilson, 2011.

References

- Akerlof, G.A. 1982, Labor contracts as partial gift exchange. *Quarterly Journal of Economics*, 97, 543-69.
- Boldrin, M., and Levine, D. 2002, The case against intellectual property. *American Economic Review, Papers and Proceedings*, 9(2), 209–12.
- Brunello G., Weber G., and Weiss C.T., 2012, Books are forever: Early life condition, education and lifetime income, IZA DP n. 6386.
- Cunha F., and Heckman J., 2007, The Technology of Skill Formation, *American Economic Review*, 97(2), 31-47.
- De Paola M. and Scoppa V., 2011, Frequency of examinations and student achievement in a randomized experiment, *Economics of Education Review*, 30, 1416-29.
- Hurt, R., and Schuchman 1966, The economic rationale of copyright. *American Economic Review*, 56, 421–32.
- Landes, W. and Posner, R. 2003, *The economic structure of intellectual property law*. Cambridge, MA: Belknap Press.
- Liebowitz S.J., 1985, Copying and Indirect Appropriability: Photocopying of Journals, *Journal of Political Economy*, 95(5), 945-57.
- Liu L. and Neilson W.S. 2011, High scores but low skills, *Economics of Education Review*, 30, 507-16.
- Müller-Langer F. and Watt R., 2010, Copyright and Open Access for Academic Works, *Review of Economic Research on Copyright Issues*, 7.1, 45-65.
- Plant A. 1934, The economic aspects of copyright in books, *Economica*, 1(2), 167–95.
- Schwerdt G. and Wupperman A.C. 2011, Is traditional teaching really all that bad? A within-student between-subject approach. *Economics of Education Review*, 30, 365-79.
- Shavell S. 2010, Should Copyright of Academic Works be Abolished?, *Journal of Legal Analysis*, 2(1), 301-58.
- Springman C.J., Buccafuoco C. and Burns Z., 2012, Valuing attribution and publication in intellectual property, Virginia Law and Economics Research Paper, 2012-02.
- Towse, R. 2006, Copyright and artists: A view from cultural economics. *Journal of Economic Surveys*, 20(4), 567–85.
- Towse, R. 2008, Why has cultural economics ignored copyright?, *Journal of Cultural Economics*, 32(4), 243-59.

Tramonte L. and Willms D.J. 2010, Cultural capital and its effects on education outcomes. *Economics of Education Review*, 29, 200-13.

Van Ours, J. 2006, Children reading fiction books because they want to, CEPR DP n. 5472.

Varian, H. 2005, Copying and copyright, *Journal of Economic Perspectives*, 19(2), 121–38.

Appendix A – List of variables

Use of the legal textbook market	1/4 degree ordinal Likert scale
Use of the illegal textbook market	1/4 degree ordinal Likert scale
Constant	
Tech and Appl Sci	0/1 Dummy variable
Math, Phys and Nat Sci	0/1 Dummy variable
Humanities	0/1 Dummy variable
Med, Vet and Pharm	0/1 Dummy variable
Males	0/1 Dummy variable
Foreign student	0/1 Dummy variable
Commuter outside province	0/1 Dummy variable
Commuter within province	0/1 Dummy variable
Local resident	0/1 Dummy variable
Temporary worker	0/1 Dummy variable
Full time worker	0/1 Dummy variable
2-year Specialist degree	0/1 Dummy variable
5-year European degree	0/1 Dummy variable
Pre-reform 4-y degree	0/1 Dummy variable
Pre-reform diplomas	0/1 Dummy variable
Attend lect. [25%-50%)	0/1 Dummy variable
Attend lect. [50%-75%)	0/1 Dummy variable
Attend lect. [75%-100%]	0/1 Dummy variable
2 nd year of enrolment	0/1 Dummy variable
3 rd year of enrolment	0/1 Dummy variable
4 th year of enrolment	0/1 Dummy variable
5 th year of enrolment	0/1 Dummy variable
Repetent student	0/1 Dummy variable
6-10 exams passed	0/1 Dummy variable
11-15 exams passed	0/1 Dummy variable
15+ exams passed	0/1 Dummy variable
Secondary school final grade	60/100
Father education degree	1/4 degree ordinal Likert scale
Mother education degree	1/4 degree ordinal Likert scale
No. non academic books read in the last year	0/+∞
Size of home library	0/+∞
Core exam	0/1 Dummy variable
Oral exam	0/1 Dummy variable
Written and oral exam	0/1 Dummy variable
Usefulness for passing exam:	
Lecture attendance	1/4 degree ordinal Likert scale
Studying with mates	1/4 degree ordinal Likert scale
Office hours	1/4 degree ordinal Likert scale
Lecture notes	1/4 degree ordinal Likert scale
Teacher notes	1/4 degree ordinal Likert scale
Textbooks (new or copied)	1/4 degree ordinal Likert scale
Additional books	1/4 degree ordinal Likert scale
Studying on the Internet	1/4 degree ordinal Likert scale
Mates study on:	
Textbooks only	0/1 Dummy variable
Mainly textbooks	0/1 Dummy variable
Mainly photocopies	0/1 Dummy variable
Photocopies only	0/1 Dummy variable
Lecture notes	0/1 Dummy variable
Teacher note	0/1 Dummy variable