

Pirates in the lab.
Using incentivized
choice experiments
to explore preference
for (un)authorized
content.

Piotr Cwiakowski,
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Piotr Cwiakowski, Marek Giergiczny, Michał Krawczyk

Faculty of Economic Sciences, University of Warsaw.

March 21, 2014

Introduction

- ▶ online piracy is pervasive, in many countries driving most of Internet traffic
- ▶ technical and legal means of prevention (e.g. HADOPI) costly and only partly successful
- ▶ how much end-users are ready to pay for legal copies?
- ▶ direct consequences esp. for new business models e.g. PWYW

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Present study

- ▶ we investigate trade off between legality and other characteristics of the product:
 - ▶ risk associated with copyright infringement
 - ▶ technical quality
 - ▶ immediate vs. delayed provision
 - ▶ price of the product
- ▶ we observe these in a real-consequence choice experiment with movies
- ▶ additionally observe the effect of “good cause”

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Related literature on copyright infringement

1. studies on impact of piracy on profits (Oberholzer-Gee and Strumpf, 2007; Smith and Telang, 2009)
2. studies on how to fight piracy (Lemley and Reese, 2004)
3. studies on behavioral aspects of piracy (Moore and Chang, 2006)
 - ▶ researchers can obtain specific information about several aspects of behavior (Al-Rafee and Cronan, 2006; Peace et al, 2003; Goles et al, 2008),
 - ▶ responses are hypothetical

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Experiments on piracy

- ▶ controlled environment, rich data yet real consequences of choices
- ▶ still, few papers so far
- ▶ most related: Maffioletti and Ramello (2004)
 - ▶ elicited WTP for original and pirated CDs
 - ▶ used hypothetical question and third-price auctions respectively
 - ▶ subjects told act of piracy already committed, auction only determines who gets the product.
 - ▶ the product insufficiently described as “full-price CD”

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Experiments on piracy cont'd

- ▶ others used more abstract, stylized game
- ▶ Hashim et al (2012): piracy as free-riding on public good.

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Design

- ▶ subjects started with 40 PLN (ca. 10 euro)
- ▶ saw a list of seven movies, asked to pick one
- ▶ these movies were pre-selected such that we could expect that almost everyone would find at least one of them attractive

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Attributes

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Attribute	levels	description
Legality	legal illegal	legal copy illegal copy; proceeds to tnttorrent.info
Risk	penalty no penalty	30% to lose 25 PLN (illegal only) no risk involved
Price	high medium low free	15 PLN 10 PLN 5 PLN 0 PLN
Pic qual	high quality low quality	quality of a DVD copy – ca. 1800 kbps inferior quality – ca. 150 kbps (illegal only)
Delay	immediate delayed	move directly available movie available after 15m

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Choice sets

- ▶ always one legal, one unauthorized, plus 'I don't watch anything'
- ▶ in the inviting e-mail we encouraged them to bring a book or similar form of back-up entertainment
- ▶ but we blocked Internet access and forbade notebooks, tablets etc.

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Course of the experiment

- ▶ subjects asked to rank options best to worst on each of 12 choice sets.
- ▶ one of the choice sets picked at random; ss got their first-best option with prob. $2/3$ and second-best with prob. $1/3$
- ▶ subjects would then spend the next ca. two hours watching the resulting movie screened on their 15 inch LCD monitors.
- ▶ earnings paid out in cash

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Treatments

- ▶ in the Baseline Condition (BC) price for legal copy (if any) passed to copyright owners.
- ▶ in the Good Cause Condition (GCC), passed to the Polish Film Institute
- ▶ in either condition, any price paid for the illegal copy sent to tnttorrent.info.
- ▶ we explicitly and solemnly promised to send the money
- ▶ after the experiment, proofs of transfers made would be displayed on the website of one of the authors.
- ▶ additionally we run analogous sessions yet all choices were hypothetical (H)
- ▶ (H was followed by another, unrelated experiment, so that R and H comparable in length and mean payments)

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Procedures

- ▶ experiment conducted in the Laboratory of Experimental Economics in Warsaw in February and March 2013.
- ▶ 228 subjects in 12 sessions (three for each of the four treatments: R-BC, R-GCC, H-BC and H-GCC).
- ▶ invited using the ORSEE Internet recruitment system from the local subject pool.
- ▶ most were students, mean age was 23.
- ▶ about 55% of participants were female.

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Modeling methodology

Assumed to base ordering on utility levels. Linear additive random utility function $U_{nj} = \beta' \mathbf{x}_{nj} + \epsilon_{nj}$ with ϵ_{nj} following an i.i.d. extreme value type I distribution. MNL:

$$P_{ni} = \frac{\exp(\beta'_n \mathbf{x}_{ni})}{\sum_j \exp(\beta'_n \mathbf{x}_{nj})}. \quad (1)$$

Additionally mixed logit (MIXL):

$$P_{ni} = \int \frac{\exp(\beta'_n \mathbf{x}_{ni})}{\sum_j \exp(\beta'_n \mathbf{x}_{nj})} \Phi(\beta | \mathbf{b}, \mathbf{\Omega}) d\beta, \quad (2)$$

where $\phi(\beta | \mathbf{b}, \mathbf{\Omega})$ is the density of the random coefficients with mean \mathbf{b} and covariance $\mathbf{\Omega}$.

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Modeling methodology cont'd

Conditional on β the probability that the decision maker n makes a sequence of T choices is the product of logit formulas, as in

$$P_{ni} = \prod_{t=1}^T \frac{\exp(\beta'_n \mathbf{x}_{nit})}{\sum_j \exp(\beta'_n \mathbf{x}_{njt})}, \quad (3)$$

where t denotes the sequence of choices made by the same respondent. Since β_n is not known, the unconditional probability is given by the integral over all possible values of β_n , i.e.

$$P_{ni} = \int \prod_{t=1}^T \frac{\exp(\beta'_n \mathbf{x}_{nit})}{\sum_j \exp(\beta'_n \mathbf{x}_{njt})} \phi(\beta | b, \Omega) d\beta, \quad (4)$$

with $\phi(\beta | b, \Omega)$ being the density of a random parameter with mean b and unrestricted covariance matrix Ω .

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Table: Estimation results

	(2) MNL generic parameters		(3) MIXL generic parameters	
	coeff.	t stat.	coeff.	t stat.
PRICE	-.120	-17.80	-1.695	-18.61
DELAY	-.261	-5.02	-.536	-5.97
RISK	-1.278	-13.24	-2.706	-14.89
QUAL_LOW	-.807	-8.39	-1.738	-9.44
ASC_L	1.934	20.53	4.578	16.24
ASC_IL	1.613	17.31	4.052	15.26
LL	-2643.83		-2032.73	
N	2736			

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Results

- ▶ for all three models signs of main coefficients consistent with expectations.
- ▶ estimates for alternative-specific constants legal and illegal are positive – respondents on average would like to watch the movie
- ▶ constant associated with the legal copy is larger than the one for the illegal illegal.
- ▶ diff. sig. at 1% level – people willing to pay for legal
- ▶ no evidence that alternative-specific parameters (legal vs. illegal) improve the fit ($(LR) = 0.86, df = 2$ implies $p = 0.65$)
- ▶ although it appears that disutility from waiting appears to be much higher if the copy is legal.
- ▶ results of MIXL estimation show substantial heterogeneity in tastes

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WTP estimates (in PLN)

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Table: WTP estimates

	Model 2		Model 3	
	mean	mean	std. dev.	median
DELAY	-2.17	-2.89	2.79	-2.08
RISK	-10.64	-14.99	12.37	-11.33
QUAL_LOW	-6.72	-9.62	7.55	-7.35
ASC_L	16.10	25.46	19.09	19.76
ASC_IL	13.43	22.37	18.98	17.15

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WTP estimates

- ▶ legal is on average about 3 PLN more valuable than illegal
- ▶ highest negative value is associated with RISK
- ▶ estimates somewhat higher than the expected value of the loss associated with this feature (7.5 PLN), suggesting risk aversion.

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Impact of treatments on WTP estimates

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Table: Impact of different treatments: WTP estimates

	GCC	BC	p	R	H	p
legal	16.68	16.23	0.75	16.46	16.47	0.99
illegal	12.32	14.02	0.06	13.65	12.74	0.56
p-value	0.00	0.11		0.04	0.01	

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Lessons learned: methodology

- ▶ choice experiments—useful to investigate preference for authorized vs. unauthorized content in the lab
- ▶ estimates show that ss made thoughtful choices
- ▶ individual WTPs showed substantial heterogeneity but were in a reasonable range for most subjects
- ▶ no evidence of hyp. bias—future studies can skip the tedious procedure
- ▶ (ss not reluctant to admit in the hyp. condition what they would really do—low “moral weight” of piracy?)
- ▶ post-experiment quest. measures not linked to observed behavior (survey instruments not well-suited to predicting actual actions?)

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Lessons learned: preference

- ▶ positive but low WTP for an authorized version of the content
- ▶ aversion to the pirated product not crowded out by the threat of punishment
- ▶ ss willing to pay for such features of the product as quality and immediate access
- ▶ a combination of prevention, suitable distr. channels and attractive pricing a viable business option, even if pirated copies available
- ▶ it might make a difference what happens with the proceeds—higher WTP in the Good Cause Condition.
- ▶ this is mostly due to lower value of the unauthorized version—perhaps an act of piracy gains in moral weight when it hurts a good cause

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