Movie Piracy and Displaced Sales in Europe: Evidence from Six Countries

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Illegitimate Consumption and Movie Sales

- unpaid consumption of copyrighted audiovisual content common practice in Europe
- e.g., recent EU survey: nearly 70% of Europeans reported to download or stream films "for free"[1]

however, effect on movie sales is unclear

- not all consumers would have bought a movie if it would not have been available "for free"
- the so-called "displacement rate" is difficult to quantify

- existing studies find very different displacement rates for movies:
    - 1 for US college students (Rob and Waldfogel (2007))
    - almost 0 for Chinese internet users (Bai and Waldfogel (2012))

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[1] "A profile of current and future audiovisual audience", European Commission (2014)

Illegitimate Consumption and Movie Sales

This is the first study that

- covers several big European countries
- uses a consistent methodology
- and is based on a big sample (about 30,000 survey respondents)

Estimating the Displacement Rate

"naive" cross-sectional approach:

1. survey among individuals: how much *unpaid* and *paid* consumption, e.g., last year?
2. does an individual *i* who consumes more *unpaid* content consume less *paid* content?

$$paid_i = \alpha + \beta \ unpaid_i + \epsilon_i \tag{1}$$

- if displacement: $\widehat{\beta} < 0$
- "full" displacement: $\widehat{\beta} = -1$

Estimating the Displacement Rate

Problem of simple cross-sectional approach:

- ▶ individuals differ in their taste for movies
  - ▶ individuals who watch many movies: both unpaid and paid consumption higher
  - ▶ individuals who watch less movies: both unpaid and paid consumption lower
- ▶ estimated displacement would be too small

formally:

$$paid_i = \alpha + \beta \ unpaid_i + \epsilon_i$$

- ▶ individuals differs in unobserved taste for films ϕ_i

$$\epsilon_i = \phi_i + e_i$$

- ▶ $corr(unpaid_i, \epsilon_i) > 0$
  $\rightarrow$ estimated displacement rate $\widehat{\beta}$ upward biased
- ▶ displacement effect would be underestimated

Estimating the Displacement Rate

Rob and Waldfogel (2007)[2] proposed an approach to deal with this problem:

- survey among 454 U.S. college students
- asked respondents
    - which of 150 films of the past three years they had watched
    - how they had watched those films
- exploit the fact that most films are seen for the first time in the year of release
- obtain for each individual: number of paid and unpaid consumption **in a given year**
- allows to control for individual taste for movies
    - "individual fixed-effects"

[2]Rob and Waldfogel (2007) Piracy on the Silver Screen. Journal of Industrial Economics, vol. 55, issue 3, pages 379-395

Estimating the Displacement Rate

formally:

$$paid_{iy}^{1st} = \alpha + \beta \; unpaid_{iy}^{1st} + \mu_i + \theta_y + \epsilon_{iy}$$

- μ_i individual fixed-effects
  - since individual fixed-effects will account for all observed and unobserved individual differences as long as these are constant over time, the displacement rate given by the coefficient estimate $\widehat{\beta}$ should no longer be upward-biased
- θ_y vintage fixed-effects
  - the vintage fixed-effects θ_y account for the possibility that paid consumption might be systematically higher for films released in one year than in others

- also take into account that movie can be seen more than once!

$$paid_{iy}^{2nd} = \phi + \kappa \; unpaid_{iy}^{1st} + \lambda \; unpaid_{iy}^{2nd} + \mu_i + \theta_y + \eta_{iy}$$

Rob and Waldfogel (2007)

find that among 454 U.S. college students:

- 1st unpaid consumption
    - reduces 1st paid consumption by 0.76 units
    - reduces 2nd paid consumption by 0.24 units
    - total displacement effect: 0.76+0.24=1 unit
- unpaid consumption reduces movie sales by about 3.5%

- **until now, no comparable evidence for Europe**

This study

- 28,344 individuals were interviewed concerning their media consumption behavior
- covering 6 major European countries: Germany, Spain, France, UK, Poland, and Sweden.
- online questionnaire was conducted in Sept. and Oct. 2014.
- focus on **movie** consumption:
  - respondents were shown a list of 100 blockbusters from 2013, 2012, and 2011
  - had to state whether they saw the movie, and how:
    - filesharing or hosting
    - cinema
    - legal online
    - on DVD or Blu-Ray
    - on TV or in airplane
- use Rob and Waldfogel (2007) approach to
  1. estimate displacement rate
  2. estimate lost movie sales

Example: List of Movies

	Seen 1st time					Seen 2nd time					Not seen 2nd time
	Cinema	Legal download, streaming or video on demand	DVD or Blu-Ray disk	File sharing or hosting site	TV (pay or free broadcast)	Cinema	Legal download, streaming or video on demand	DVD or Blu-Ray disk	File sharing or hosting site	TV (pay or free broadcast)	Not seen 2nd time
The Hangover Part III	X						X				
The Conjuring		X									
Gravity			X								X
Oblivion			X								
Django Unchained		X									
The Woman in Black											
Bridesmaids			X					X			
The Impossible	X										
...											

Eliciting Truthful Responses

- getting truthful answers is a problem in a questionnaire that is supposed to inquire about illegal behavior
- therefore, in accordance with previous literature
    1. we ensured the anonymity of respondents
    2. we avoided terms that may have a negative association, e.g. terms like "illegal" and "piracy"

Descriptive Statistics

	Whole Sample		Germany		UK		Spain	
	First	Second	First	Second	First	Second	First	Second
Seen (2013)	5.878	1.534	5.083	1.283	6.369	1.701	7.126	1.833
Seen (2012)	5.534	1.426	4.475	1.064	6.693	1.788	7.174	1.885
Seen (2011)	5.472	1.461	4.507	1.109	6.161	1.779	6.525	1.680
Seen	16.88	4.421	14.07	3.457	19.22	5.268	20.83	5.398
Paid	14.81	3.874	13.35	3.291	17.93	4.805	16.48	4.327
Unpaid	1.969	0.547	0.648	0.166	1.239	0.463	4.239	1.072
Unpaid/Seen	11.66%	12.37%	4.61%	4.80%	6.45%	8.79%	20.35%	19.86%
Respondents	28,344		4,881		4,448		4,758	

Descriptive Statistics

	France		Poland	
	First	Second	First	Second
Seen (2013)	5.603	1.523	6.041	1.608
Seen (2012)	3.930	1.020	7.221	1.981
Seen (2011)	5.355	1.483	5.605	1.467
Seen	14.89	4.026	18.87	5.056
Paid	12.35	3.314	15.26	4.285
Unpaid	2.349	0.712	3.433	0.772
Unpaid/Seen	15.78%	17.69%	18.19%	15.27%
Respondents	4,798		4,770	

Main Results

VARIABLES	(1) Cross-Sectional Approach Legal 1st Views	(2) Panel Approach Legal 1st Views	(3) Panel Approach Legal 2nd Views
Illegal Online (1st Views)	-0.199***	-0.419***	0.0457***
	(0.0137)	(0.00940)	(0.00602)
Illegal Online (2nd Views)			-0.219***
			(0.0103)
Country FE	YES	NO	NO
Individual Controls	YES	NO	NO
Individual FE	NO	YES	YES
Vintage Fixed Effects	NO	YES	YES
Observations	28,344	85,032	85,032
Individuals	28,344	0.042	0.010
R-squared	0.087	28,344	28,344

- Panel Approach: 1 illegal 1st view reduces legal 1st views by 0.419 units
    - consistent with theory: estimated displacement rater higher than with cross-sectional approach
- 1 illegal 1st view marginally **increases** legal 2nd views
    - small "sampling effect": consumers might use unpaid downloads to find out whether they like a movie
    - through this channel, unpaid consumption might actually stimulate movie sales

Panel Results by Country

	(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)	(9)	(10)	(11)	(12)
	First Paid Viewings							Second Paid Viewings					
	Germany	UK	Spain	France	Poland	Sweden		Germany	UK	Spain	France	Poland	Sweden
1st unpaid	-0.427***	-0.459***	-0.532***	-0.399***	-0.446***	-0.386***		0.0317	0.0571***	0.0258**	0.0331***	0.0552***	0.00916
	(0.0369)	(0.0307)	(0.0149)	(0.0195)	(0.0176)	(0.0168)		(0.0239)	(0.0203)	(0.0101)	(0.0126)	(0.0116)	(0.0104)
2nd unpaid								-0.142***	-0.389***	-0.254***	-0.132***	-0.228***	-0.152***
								(0.0410)	(0.0318)	(0.0172)	(0.0210)	(0.0224)	(0.0203)
Observations	14,643	13,344	14,274	14,394	14,310	14,067		14,643	13,344	14,274	14,394	14,310	14,067
Individuals	4,881	4,448	4,758	4,798	4,770	4,689		4,881	4,448	4,758	4,798	4,770	4,689
R-squared	0.048	0.036	0.143	0.189	0.166	0.064		0.011	0.018	0.028	0.043	0.042	0.008

▶ displacement rates relatively similar

Lost Sales

for whole sample, respondents reported

- 55810 unpaid first viewings
- 1 unpaid first viewing reduces paid viewings by 0.37

- 15496 second unpaid viewings
- 1 unpaid second viewing reduces paid viewings by 0.219

total lost viewings: 55810*0.37+15496*0.219=24043

- implies that about 4.4% of movie sales were lost
- for comparison, for 454 U.S. college students Rob and Waldfogel (2007) find 3.5%

Lost Sales by Country

	Displacement rate			Lost Sales
	1st on 1st	1st on 2nd	2nd on 2nd	
Germany	-42.69%	3.17%	-14.21%	1.65%
UK	-45.87%	5.71%	-38.95%	2.89%
Spain	-53.20%	2.58%	-25.37%	10.41%
France	-39.86%	3.31%	-13.21%	5.73%
Poland	-44.64%	5.52%	-22.78%	7.21%
Sweden	-38.63%	0.92%	-15.19%	7.65%

Lost Sales by Age

Age	Displacement rate			Lost Sales
	1st on 1st	1st on 2nd	2nd on 2nd	
14 years	-32.20%	6.43%	-17.51%	1.47%
15 years	-41.70%	9.04%	2.51%	1.84%
16 years	-45.75%	2.93%	-13.16%	4.90%
17 years	-50.18%	0.89%	-25.00%	6.95%
18-24 years	-47.87%	3.59%	-25.58%	7.64%
25-34 years	-39.68%	6.65%	-26.23%	4.83%
35-44 years	-39.13%	4.47%	-14.04%	3.48%
45-54 years	-39.06%	-0.14%	-21.29%	2.76%
55-64 years	-27.12%	5.40%	-14.27%	0.88%
65-74 years	-32.24%	-4.45%	13.58%	0.91%

Conclusions

- conducted a big online survey regarding movie consumption of European consumers
- used the approach by Rob and Waldfogel (2007) to estimate the displacement rate
- found that one illegal 1st view of a movie
  - decreased legal 1st views by about 0.419 units
  - slightly *increased* legal 2nd views by 0.04 units ("sampling effect")
- lost movie sales for the whole sample due to illegal consumption are about 4.38%

Working Paper

"Movie Piracy and Displaced Sales in Europe: Evidence from Six Countries"

available online on *Social Science Research Network*
https://ssrn.com/abstract=2844167

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