

## PIRACY AND THE DEMAND FOR FILMS: ANALYSIS OF PIRACY BEHAVIOR IN FRENCH UNIVERSITIES

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ABSTRACT. The purpose of this article is to identify which, if any, segments of the movie business have suffered from digital piracy. We use a sample of 620 university members including undergraduate students, graduate students and professors to assess the effect of digital piracy on legal demand. A large percentage of respondents get pirated movies from a variety of channels (on P2P networks, intranet, by physical means...). Surprisingly, approximately one third of the pirates declared that watching pirated movies increased their demand for films (for instance, it led them to rent or purchase videos that they would not have rented or purchased otherwise). Using regressions analysis, we find no impact of piracy on theater attendance, and a strong impact on video rentals and purchases. However, movie piracy has no impact on video rentals for respondents who use pre-paid pricing schemes at video-stores.

### 1. INTRODUCTION

Do movies face serious competition from free illegal copies available on the Internet? Is the “quality” of most illegal Internet Movies (Divx) good enough to compete with originals? If so, which components of the movie business is most at risk? Using survey data, we study how movie piracy affects the demand for films.

Movies are seen in four different venues: theaters, DVD purchases, DVD rentals, pay and Free TV. From 1998 to 2002, box office sales faced a sharp increase in the main European countries (12% in France and 17% in Germany) and in the US (37%)<sup>1</sup> but experienced a drop over the period 2002-2005 of about -1% in France, -22,5% in Germany and -5,6% in the US. Likewise, after an explosive revenue growth from DVD sales in the US, the growth in U.S. shipments of DVD films have sharply declined in 2005 to 9% compared to 50% growth in both 2003 and 2004 (Coplan, 2006). Globally, Coplan points out that “as prices fell, DVD sales to end consumers in dollar figures grew just 5%. Including the shrinking VHS market, overall consumer spending on home video actually shrank by 1% during 2004-2005”. This trend is similar in Europe where the VHS format is almost outdated<sup>2</sup> and “retail DVD sales continued to grow in 2005 albeit at a slower rate than in previous years.

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<sup>1</sup>Centre National de la Cinématographie – Motion Picture Association of America.

<sup>2</sup>According to a Screen Digest report (2006), “Spending on retail VHS in Western Europe fell by 70 per cent in 2005 from €857m in 2004 to €261m. Even in Central and Eastern Europe, where the DVD market is less developed, demand for VHS has declined almost as dramatically; spending on retail VHS totaled €27m, falling by 63 per cent compared to 2004”. In a similar way, the report details that “total spending on rental video in Europe declined for the third consecutive year in 2005, falling by seven per cent compared to 2004. The decline of the rental VHS sector was to blame, as a nine per cent rise in spending on DVD rental could not compensate for a 75 per cent fall in VHS rental spending. In fact, our research indicates that the VHS rental market

Volume sales of DVD increased by 15 per cent to 657m units, accounting for 94 per cent of total European video sales. However, the gain in volume sales failed to be translated into spending as the average price of a retail DVD in Europe declined by around 13 per cent in 2005” (Screen Digest, 2006).

In France, the home video market is worse off; the trade union of the video edition (SEV), which includes editors and distributors of audiovisual and cinematographic works published on DVD and VHS, announced for the first time in July 2006, a fall of 9% in volume and 13.5% of its sales turnover in the first half of the year. According to SEV, “the fall of the market reflects the impact of piracy which, like it has been raised on several occasions at the time of the parliamentary debate (...), must more than ever to be fought”.

Although piracy could still explain part of this trend, industry analysts attribute the recent drops in the number of box office tickets and/or video purchases to: the shortening of the time window between a movie appearance at the box office and its release in DVD format; the maturity of the DVD format; the development of video-on-demand, rent-by-mail and pay-per-view services. For instance, during the period 1988-2002, Waterman (2005) reports a decrease of the median video window from 200 days to slightly above 150 day.<sup>3</sup> This factor might be reflected in the revenues generated from DVDs that represented on average 59% of film revenue in the first quarter of 2005 compared to 48% in the same period in 2004 according to Edward Jay Epstein.<sup>4</sup> These figures are also confirmed by Coplan: “The home video market continued to grow through the 1990s, becoming the largest single component of studio revenues alongside theatrical receipts, sales to TV networks (i.e. Free TV), pay TV revenues, and licensing fees. By 2004, home video sales accounted for 51% of studio top lines. By 2005, home video profits at the major U.S. media conglomerates made up as much as 35% of total firm operating income.” However, even though the video window argument can explain the drop in box office sales, it cannot account for the slowdown in video purchases.

While music piracy has made headline news and generated many economic studies, there are fewer studies that specifically focus on movie piracy. However, there are several reasons to think that movie consumption has important differences from music consumption; therefore, results obtained in the music industry cannot be applied as such to analyze movie piracy. First, people listen to musical CDs several times and each listening requires little attention. Indeed, people listen to music while jogging, reading, and traveling. Watching a video DVDs or going to a movie theater is a full-time activity. Secondly, music is an experience good for which the sampling effect is important: people like to listen to short samples of songs of an album before purchasing the CD. Because few people watch the same movie several times, this sampling effect is probably weaker for movies. Thirdly, music files can be efficiently transferred from one computer to another using portable storage devices, CD-Rs or P2P networks. On the other hand, burning DVDs or downloading movies from P2P network is more costly, more time-consuming and/or results

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almost entirely evaporated in 2005, generating just €121m across all 22 countries analyzed and accounting for only five per cent of total rental spending”.

<sup>3</sup>See also Epstein, E.J., “Hollywood’s death spiral: the secret numbers tell the story”, Slate magazine, July 2005. Epstein claims that for some major titles, this window has decreased from 6 months to less than 3 months.

<sup>4</sup>Epstein assesses the contribution of the video revenues in the worldwide studio receipts over 2000 and 2003 to 37.1% and 45.9% respectively.

in lower quality (because of the lack of subtitles, choice of language, direct access to a scene for compressed movie files). Finally, music producers mainly generate revenues from a single support (CD), while film producers generate revenues from the box office, DVD purchases, DVD rentals and TV programming. Movie piracy, therefore, may have differential impact on different segments of the movie business, a complication not found for music.

The theoretical literature on piracy of digital products points to an overall negative effect of piracy on movie demand, because the main impacts are likely to be negative. According to Peitz and Waelbroeck (2006), the positive effect of piracy on legal demand can arise from network externalities, informational externalities or indirect appropriation. There is little evidence of the existence of network externalities in movie consumption, which could occur if people who copy films interest their friends with higher willingness to pay for films to see or buy DVDs of the film. Although we already argued that sampling is probably limited for movie piracy, there is still a case for positive informational externalities through positive word-of-mouth. Movie piracy would have no effect on demand if the only people who illegally copy videos or download films from the internet would not have purchased the original anyway. Indirect appropriation, where those who make copies of videos pay higher prices for them in relation to the number of copies they produce seems unlikely.

The empirical literature is scarce. Rob and Waldfogel (2005) use a sample of 500 college students to study the impact of digital piracy on film consumption. They analyze legal and unauthorized viewing of the top 50 movies during the period 2003-2005. For each movie, they determine if it was first watched legally or illegally using a digital copy. They observe that only 5.2 percent of the students get unpaid copies. They use a regression analysis to explain the number of times a person first legally watched a movie by the number of times she first watched it using a digital copy, controlling for other factors. The strongest effect of piracy in their sample is on rentals, followed by DVD purchases and theater attendance.

The purpose of this article is to identify which, if any, segments of the movie business have suffered from digital piracy. We use a sample of 620 university members including undergraduate students, graduate students and professors to assess the effect of digital piracy on legal demand. Respondents were asked how frequently they go to movie theaters and how frequently they rent or purchase a video. We then ask them how frequently they get unauthorized digital copies and by which means (internet peer-to-peer networks, specialized internet sites, intranet networks, physical exchanges).

A large percentage of respondents get pirated movies from a variety of channels (on P2P networks, intranet, by physical means. . .). Surprisingly, approximately one third of the pirates declared that watching pirated movies increased their demand for films (for instance, it led them to rent or purchase videos that they would not have rented or purchased otherwise). Using regressions analysis, we find no impact of piracy on theater attendance, and a strong negative impact on video rentals and purchases. However, movie piracy has no impact on video rentals for respondents who use pre-paid pricing schemes at video-stores.

The remainder of the paper is organized as follows. First, we present descriptive statistics from our data set. Second, we provide an econometric analysis to study the impact of movie piracy on theater attendance, video purchases and video rentals.

## 2. DATA

We administered an anonymous online survey during March-April 2005. Students, professors and administrative staff from more than 31 French Universities and “Grandes Ecoles” (graduate schools) were involved with a total of 620 answers. Summary statistics are given in the Appendix and detailed in Bounie et al. (2006).

**2.1. Demand segments.** We asked to the respondents how frequently they go to a movie theater, purchase or rent a video (DVD or VHS): never, rarely, several times per year, several times per month, several times per week. Respondents go frequently to movie theater (only 9% never or rarely go to movie theater, whereas 38.3% go monthly or weekly). By comparison, respondents purchase or rent videos less frequently: 64.5% never or rarely purchase videos, and 60.7% never or rarely rent videos. Overall the movie demand segments are strongly correlated for theater and video experience (either video purchase or rental).

**2.2. Digital piracy.** We asked several questions related to digital piracy: the frequency, the type of piracy (P2P, intranet, physical exchanges), the number of movie files stored on the computer, the type of movies they mainly look for (French, American or other) and piracy behavior (keep pirated movie files or not, view pirated movie several times or only once, movie sharing and sampling).

Among the respondents, 33.4% have never got a pirated movie, whereas 33.4% get pirated movies either monthly or weekly.

Table 1: Theater Attendance and Piracy

Theater attendance	Piracy					
	Never	Rarely	Year	Month	Week	Total
Never	4	1	1	4	3	13
	30.8	7.7	7.7	30.8	23.1	100.0
	1.9	1.3	0.8	3.3	3.5	2.1
Rarely	23	6	6	3	5	43
	53.5	14.0	14.0	7.0	11.6	100.0
	11.1	7.7	4.7	2.5	5.8	6.9
Year	102	35	74	67	49	327
	31.2	10.7	22.6	20.5	15.0	100.0
	49.3	44.9	57.8	55.8	56.3	52.7
Month	78	36	47	46	30	237
	32.9	15.2	19.8	19.4	12.7	100.0
	37.7	46.2	36.7	38.3	34.5	38.2
Total	207	78	128	120	87	620
	33.4	12.6	20.7	19.4	14.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0

In Tables 1 to 3, we tabulated the frequency of piracy by the intensity of the different demand segments (we grouped weekly and monthly frequencies for theater attendance, video purchases and rentals). Table 1 indicates that there is no obvious substitution pattern between theater attendance and piracy: only 15 persons (or 25%) out of the 56 who never go to movie theaters or only a few times per year frequently download movies (several times per month or per week). On the

other hand, 32% of the persons who frequently go to the movies (several times per month) also frequently obtain illegal digital movies (several times per month or per week). In Tables 2 and 3, the substitution is more pronounced, as people who never or rarely purchase or rent videos frequently obtain digital movies illegally. For instance, 36% of the persons who never or rarely rent videos frequently download movies (monthly or weekly), compared to 30% of the persons who rent videos several times per month.

Table 2: Video Purchases and Piracy

Video Purchases	<i>Piracy</i>					Total
	Never	Rarely	Year	Month	Week	
Never	68	24	46	48	41	227
	30.0	10.6	20.3	21.2	18.1	100.0
	32.9	30.8	35.9	40.0	47.1	36.6
Rarely	57	26	38	29	23	173
	33.0	15.0	22.0	16.8	13.3	100.0
	27.5	33.3	29.7	24.2	26.4	27.9
Year	58	18	37	34	16	163
	35.6	11.0	22.7	20.9	9.8	100.0
	28.0	23.1	28.9	28.3	18.4	26.3
Month	24	10	7	9	7	57
	42.1	17.5	12.3	15.8	12.3	100.0
	11.6	12.8	5.5	7.5	8.1	9.2
Total	207	78	128	120	87	620
	33.4	12.6	20.7	19.4	14.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0

Table 3: Video Rentals and Piracy

Video rentals	<i>Piracy</i>					Total
	Never	Rarely	Year	Month	Week	
Never	95	31	50	56	43	275
	34.6	11.3	18.2	20.4	15.6	100.0
	45.9	39.7	39.1	46.7	49.4	44.4
Rarely	24	18	21	25	13	101
	23.8	17.8	20.8	24.8	12.9	100.0
	11.6	23.1	16.4	20.8	14.9	16.3
Year	52	19	43	23	21	158
	32.9	12.0	27.2	14.6	13.3	100.0
	25.1	24.4	33.6	19.2	24.1	25.5
Month	36	10	14	16	10	86
	41.9	11.6	16.3	18.6	11.6	100.0
	17.4	12.8	10.9	13.3	11.5	13.9
Total	207	78	128	120	87	620
	33.4	12.6	20.7	19.4	14.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0

**2.3. Piracy behavior.** People get pirated movies by different means: from P2P networks, from an Intranet, by physical exchanges (CD-R, DVD-R, USB keys, ...) or from Topsites.<sup>5</sup> In Table 4, we tabulate the frequency of piracy by the different means of acquiring digital movie files (in percentage of the total population). Table 4 reveals that people who rarely pirate films mainly obtain them from physical exchanges, while those getting movies files on a regular basis use the Internet, the intranet and physical exchanges. Professional hackers who belong to the TopSite community are also frequent pirates.

Table 4. Piracy Technology<sup>6</sup>

<i>Frequency</i>	<i>P2P</i>	<i>Top sites</i>	<i>Intranet</i>	<i>Exchanges</i>
Rarely	20	1	13	53
Year	71	3	44	89
Month	72	10	64	68
Week	51	16	60	46
Total	214	30	181	256
	34.5	4.8	29.2	41.3

Table 5 describes the number of pirated movies available to the respondents. The distribution pattern shares the characteristics of power laws or distributions with heavy tails: 70% have less than 15 pirated movies, while 10 % have more than 100 movie files or copies.

Table 5. Stock of Pirated Movies

<i>Piracy stock</i>	<i>Freq.</i>	<i>Percent</i>	<i>Cum.</i>
0	213	34.35	34.35
1-5	124	20	54.35
6-15	98	15.81	70.16
16-30	62	10	80.16
31-50	34	5.48	85.65
51-70	16	2.58	88.23
71-100	16	2.58	90.81
101-500	44	7.1	97.9
More than 500	13	2.1	100
Total	620	100	

Table 6 describes piracy behavior among the respondents. Surprisingly, more than 30 percent watch their pirated movie several times. Watching pirated movies can also increase the demand for films: 48 percent claim that they have discovered new actors or directors, and for 30 percent of respondents, watching pirated movies

<sup>5</sup>Topsite is referring to high-speed FTP servers used by release groups and couriers for distribution, storage and archival of warez releases (copyrighted material traded in violation of copyright law). Topsites have very high-bandwidth Internet connections, commonly supporting transfer speeds of hundreds to thousands of megabits per second; enough to transfer a full DVD in minutes.

<sup>6</sup>Respondents were allowed multiple choices.

has led them to purchase movies that they would have most likely not purchased otherwise. Thus some of the movies that are illegally acquired might simply reduce the dead weight loss due to market power without reducing profits. However, to some extent, piracy of movies competes with subscription-based television (like cable or satellite) where the marginal cost of viewing a movie is zero. The respondents mainly look for American movies and only marginally to French movies; this might be due to the fact that American films are more widely available on P2P networks.

Table 6. Piracy and Consumption Behavior

<i>Variable</i>	<i>Mean</i>
Keep more than half	0.217742
Watch several times	0.314516
Discover new actors/directors	0.482258
Induce new purchases	0.309677
Mainly search American movies	0.235484
Mainly search French movies	0.017742

Table 7 describes the perceived effect of piracy on movie consumption. There is a perception that piracy is decreasing the number of times people watch a movie from a rented video, while the effect is not as clear on video purchases and is even positive for theater attendance. It is clear that this question is highly subjective and answers are probably biased, as respondents might have incentives to minimize the impact of piracy. However, there is no reason to believe that answers are more biased for movie theatres than for video rentals. Therefore, our point that the negative effect of piracy is the largest for video rentals and the smallest for movie theaters seems robust. This confirms our analysis of Section 2.2 that showed that substitution due to piracy was more pronounced for video rentals and purchases than for movie theater attendance.

Table 7. Influence of Piracy on Consumption

	<i>Theaters</i>	<i>Video purchases</i>	<i>Video rentals</i>
Increase	17.32	14.78	4.96
decrease	6.59	14.53	22.58
Same	76.10	70.69	72.46
Total	100	100	100
# Obs.	410	406	403

### 3. ECONOMETRIC ANALYSIS

In order to test the effect of digital piracy on the demand for movies, we seek to estimate the intensity of each demand segment by a set of control variables and the piracy variables in a set of reduced form equations. We run regression with the frequency of piracy activities and the type of digital piracy. This section reports the main findings. Details are given in Bounie et al. (2006).

Table 8. Estimation Results – Movie Theaters and Piracy Types

	<i>Coef.</i>	<i>Std. Err.</i>	<i>p-values</i>
Internet connection	0.022	0.068	0.751
ADSL			
Cable	-0.133	0.113	0.239
Intranet	-0.052	0.102	0.610
Internet work	0.123	0.124	0.322
Internet time	-0.006	0.005	0.265
Information-push	0.111*	0.060	0.065
Radio or TV show			
Magazines	0.420***	0.081	0.000
Movie site	0.277***	0.057	0.000
Equipment	0.023	0.087	0.789
DVD/VHS player			
Home cinema	0.046	0.062	0.455
Divx player	0.019	0.066	0.773
Female	-0.035	0.055	0.528
Age	-0.007	0.005	0.127
Status	0.013	0.108	0.908
Professor			
Administrative staff	-0.195*	0.113	0.085
Income	0.119*	0.064	0.066
300 - 900 EUR			
900 - 1500 EUR	0.239**	0.080	0.003
1500 - 3000 EUR	0.075	0.104	0.473
More than 3000 EUR	0.286**	0.141	0.042
Information-pull	0.193***	0.057	0.001
Newspapers, TV or radio shows			
Specialize magazines	0.099	0.077	0.199
Previews	-0.048	0.060	0.422
Online reviews	-0.010	0.062	0.878
Ads	-0.003	0.054	0.960
Word of mouth	0.175**	0.072	0.015
Other information sources	0.194*	0.100	0.053
No information	0.140	0.149	0.348
Theater pass or subscription	0.797***	0.082	0.000
Club membership	0.217*	0.129	0.092
Use price comparison sites	0.022	0.103	0.834
Purchase DVDs with bonus	0.031	0.068	0.652
Information on videos	-0.227***	0.082	0.006
Newspapers, TV or radio shows			
DVD reviews	-0.098	0.106	0.355
Internet previews	0.133	0.115	0.249
Online customer reviews	-0.059	0.125	0.634
Forum discussions	-0.029	0.134	0.828
Word of mouth	0.089	0.065	0.171
Other information sources	-0.052	0.087	0.553
No information	-0.008	0.067	0.903
Rental Subscription	0.011	0.053	0.831
TV subscription	-0.029	0.068	0.673
TV pay per view	-0.103	0.105	0.327
Piracy	0.054	0.059	0.355
Internet peer-to-peer			
Top sites	-0.278**	0.119	0.020
Intranet	-0.042	0.066	0.522
Physical exchanges	-0.034	0.055	0.534
Constant	1.776***	0.201	0.000

$R^2 = 0.38$ ,  $n = 620$ ,  $SSR = 119$



**3.1. Theater attendance.** For movie theaters, we do not find any significant negative effect of the intensity digital piracy. As a matter of fact most coefficients associated with piracy have a positive sign. However, people who get their movie files for top sites belong or are close to professional hacker organizations and can get film even before their official release date at the box office. This translates into a statistically negative effect of this form of piracy on movies attendance (Table 8). Status and income variable significantly influence the frequency of movie theater attendance. It is interesting to note that general purpose information (information-push) is more relevant to motivate theater attendance than information-pull services, except for word-of mouth communication. As expected those who have a theater pass or subscription go to movie theaters more frequently. Interestingly, having a TV subscription does not seem to prevent people from going the movie theaters as the effect of this variable is not significantly different from zero.

**3.2. Videos.** We first ran a probit regression to explain the probability that a person purchases at least one video (VHS or DVD). Results are reported in Table 9. The frequency of piracy has a negative and significant effect on the probability to purchase a video. However, when we restrict the sample to people who purchase at least one video, we do not find any significant negative effect of piracy. Thus, piracy mainly reduces the probability to purchase a video, but not the number of videos purchased, which means that the effect of piracy is strongest for those who purchase a small number of videos per year. This seems to suggest that the substitution of video purchases by pirated movies is very high (almost 100%) for people who do not have a strong taste for videos. For those who have continued to purchase videos, pirating movies does not affect video consumption in an obvious way.

Monetary income does not influence the probability to purchase a video but status does. Respondents who own home cinema equipment purchase videos more frequently, as expected from economic theory. Interestingly, theater pass and subscriptions seems complementary to the intensity of video purchases. There is no significant effect of TV subscription or PPV on video purchase intensity. Information-pull forum discussion also increase purchase propensity, while the “use price comparison sites” variable reflects both a negative income effect and a positive taste for movies effect; the latter interpretation explains the positive sign associated with this variable.

**3.3. Video rentals.** We ran a global regression for the effect of piracy on video rentals and find no significant effects. However, when we focus on the probability to rent a video on the subsample of respondents who do not have a rental subscription, we find a very strong and significantly negative effect (Table 10), which is even increased if we take the effect of intranet connection into account. For the complementary population of subscribers, we do not find any significant effect of piracy. People who have subscribed to a video store (that is, pre-paid for video rentals) face a zero marginal cost of renting a video (up to the pre-paid amount). Therefore, pirated movies have no advantage in terms of marginal cost of watching a movie.

Table 9. Estimation Results – Probability of Purchase and Piracy Frequency

	<i>Coef.</i>	<i>Std. Err.</i>	<i>p-values</i>
Internet connection	0.224	0.157	0.153
ADSL			
Cable	-0.060	0.254	0.812
Intranet	0.066	0.228	0.771
Internet work	0.334	0.286	0.243
Internet time	0.011	0.012	0.344
Information-push	-0.038	0.136	0.780
Radio or TV show			
Magazines	0.294	0.188	0.117
Movie site	0.080	0.129	0.536
Equipment	0.935***	0.201	0.000
DVD/VHS player			
Home cinema	0.189	0.145	0.193
Divx player	0.252*	0.153	0.099
Female	0.014	0.126	0.910
Age	-0.019*	0.011	0.073
Status	0.480*	0.254	0.058
Professor			
Administrative staff	0.931***	0.278	0.001
Income	0.082	0.144	0.568
300 - 900 EUR			
900 - 1500 EUR	0.025	0.178	0.886
1500 - 3000 EUR	-0.161	0.239	0.501
More than 3000 EUR	0.418	0.333	0.209
Information-pull	-0.052	0.125	0.678
Newspapers, TV or radio shows			
Specialize magazines	0.107	0.167	0.524
Previews	0.141	0.131	0.281
Online reviews	-0.049	0.138	0.720
Ads	0.164	0.122	0.179
Word of mouth	0.125	0.164	0.448
Other information sources	0.295	0.236	0.212
No information	-0.113	0.347	0.744
Theater pass or subscription	0.206	0.191	0.281
Club membership	0.763**	0.360	0.034
Rental Subscription	0.051	0.121	0.673
TV subscription	0.014	0.159	0.931
TV pay per view	0.033	0.242	0.891
Piracy	-0.016	0.198	0.936
Rarely			
Several times per year	-0.158	0.176	0.370
Several times per month	-0.399**	0.188	0.034
Several times per week	-0.449**	0.216	0.037
Constant	-0.907*	0.481	0.059

$R^2 = 0.13$ ,  $n = 620$ ,  $\log\text{-lik} = 356$

Table 10. Estimation Results – Video Rentals and Piracy Frequency (no subscriptions)

	<i>Coef.</i>	<i>Std. Err.</i>	<i>p-values</i>
Internet connection	0.191	0.196	0.330
ADSL			
Cable	0.203	0.326	0.533
Intranet	-0.856**	0.384	0.026
Internet work	0.328	0.384	0.393
Internet time	0.013	0.015	0.362
Information-push	-0.044	0.181	0.808
Radio or TV show			
Magazines	0.187	0.244	0.442
Movie site	0.264	0.169	0.119
Equipment	1.062***	0.368	0.004
DVD/VHS player			
Home cinema	0.205	0.179	0.253
Divx player	0.107	0.181	0.554
Female	0.343**	0.160	0.032
Age	-0.007	0.012	0.595
Status	-0.285	0.294	0.332
Professor			
Administrative staff	-0.427	0.323	0.186
Income	0.324	0.209	0.120
300 - 900 EUR			
900 - 1500 EUR	0.510**	0.236	0.031
1500 - 3000 EUR	0.365	0.301	0.226
More than 3000 EUR	0.791**	0.378	0.036
Information-pull	0.112	0.169	0.509
Newspapers, TV or radio shows			
Specialize magazines	-0.062	0.227	0.784
Previews	0.091	0.179	0.612
Online reviews	0.028	0.185	0.878
Ads	-0.009	0.165	0.959
Word of mouth	0.234	0.222	0.292
Other information sources	0.313	0.313	0.318
No information	-0.429	0.467	0.359
Theater pass or subscription	-0.216	0.239	0.366
Club membership	0.751*	0.405	0.063
Use price comparison sites	0.507*	0.295	0.086
Purchase DVDs with bonus	0.214	0.194	0.271
Information on videos	-0.091	0.237	0.700
Newspapers, TV or radio shows			
DVD reviews	0.056	0.308	0.856
Internet previews	-0.174	0.356	0.625
Online customer reviews	-0.384	0.370	0.299
Forum discussions	-0.272	0.426	0.522
Word of mouth	-0.088	0.196	0.653
Other information sources	0.705***	0.258	0.006
No information	0.137	0.195	0.483
TV subscription	-0.232	0.199	0.244
TV pay per view	0.521	0.324	0.107
Piracy	-0.022	0.246	0.929
Rarely			
Several times per year	-0.194	0.225	0.388
Several times per month	-0.410*	0.247	0.097
Several times per week	-0.553*	0.311	0.075
Constant	-2.443***	0.642	0.000

$R^2 = 0.18$ ,  $n = 420$ ,  $\log\text{-lik} = 221$

## 4. CONCLUSION

The goal of our paper was to assess the impact of piracy on demand for films. Contrary to what movie producers are claiming, internet piracy seems to have little negative effect on theater attendance in our sample of people from the university community. The strongest effect of piracy is on video (VHS, DVD) purchases and rentals. However, for consumers who use pre-paid pricing schemes in video-stores, movie piracy seems to have a small impact.

We would like again to stress that our sample is very specific. Nevertheless, if confirmed by other studies, our results suggest that the video segment suffers the most from internet piracy and that on the contrary the movie theater segment could be able to generate stable or increasing revenues even in a world of illegal file-sharing. New business models such as internet movie on demand could also be able to generate revenues from people who mainly rented videos in the past and who have switched to the convenience of watching pirated movies. In addition, our results suggest that subscription-based pricing could be a relevant strategy to compete with piracy, as a zero marginal cost for watching a movie legally reduces incentives to get pirated movies.

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## Appendix

<i>Variable</i>	<i>Description</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Internet connection	Which type of Internet access do you have?				
ADSL		0.616			
Cable		0.066			
Intranet		0.111			
Internet work	Do you have Internet connection at work	0.960			
Internet time	How many hours do you spend on the Internet per day?	3.816	5.047	0	24
Information about films	Do you watch a TV program or listen to a radio program dedicated to movie news on a regular basis?	0.269			
Radio or TV show					
Magazines	Do you read a movie magazine on a regular basis?	0.161			
Club membership	Are you member of a movie club? Y/N	0.040			
Movie site	Do you visit Internet sites dedicated to movies (like Allociné, IMDB, etc.) on a regular basis?	0.502			

<i>Variable</i>	<i>Description</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Equipment	Do you have a VHS or a DVD player?				
DVD/VHS player		0.898			
Home cinema	Do you have one of the following home theater devices: LCD TV, plasma TV, projector, speaker system.	0.216			
Divx player	Do you have a DivX-compatible DVD player?	0.187			
Female	What is your gender?	0.410			
Age	Age	27.75	9.604	16	70
Status	What is your status?				
Professor		0.156			
Administrative staff		0.095			
Student		0.748			
Income	What is your monthly income (including disposable income)?	0.308			
300 - 900 EUR					
900 - 1500 EUR		0.182			
1500 - 3000 EUR		0.139			
More than 3000 EUR		0.089			
Less than 300 EUR		0.282			
Information on films in theaters	Before going to the theater, where do you get information about movies?				
Newspapers, TV/radio shows		0.544			
Specialize magazines		0.190			
Previews		0.379			
Online reviews		0.248			
Ads		0.350			
Word of mouth		0.816			
Other information sources		0.069			
No information		0.035			
Theater pass or subscription	Do you have a theater pass (subscription)?	0.106			
Use price comparison sites	Do you use a shopbot (price comparison site) before purchasing your videos?	0.065			
Purchase DVDs with bonus	Do you most often purchase the standard edition or the collector edition of DVDs?	0.210			
Information on DVDs	Before purchasing a video, where do you get information?				
Newspapers, TV/radio shows		0.139			
DVD reviews		0.076			
Internet previews		0.061			
Online customer reviews		0.060			
Forum discussions		0.048			
Word of mouth		0.265			
Other information sources		0.098			
No information		0.226			
Rental Subscription	Do you pay video rentals per-unit or do you have a video rental pre-paid card?	0.323			
TV subscription	Do you subscribe to a pay-TV dedicated to movies?	0.177			
TV pay per view	Have you ever purchased a movie on pay-per-view?	0.065			
Piracy frequency	How often do you get pirated movies?				
Rarely		0.126			
Several times per year		0.206			
Several times per month		0.194			
Several times per week		0.140			
Piracy type	Among the following techniques, which do you use to get pirated movies?				
P2P		0.348			
Top sites		0.048			
Intranet		0.292			
Exchanges		0.413			

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