

# Movie Piracy and Sales Displacement in Two Samples of Chinese Consumers

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## Abstract

Intellectual property piracy is widely believed, by authorities in both U.S. industry and government, to be rampant in China. Because we lack evidence on the rate at which unpaid consumption displaces paid consumption, we know little about the size of the effect of pirate consumption on the volume of paid consumption. We provide direct evidence on both the volume of unpaid consumption and the rate of sales displacement for movies in China using two surveys administered in late 2008 and mid-2009. First, using a survey of Chinese college students' movie consumption and an empirical approach parallel to a similar recent study of U.S. college students, we find that three quarters of movie consumption is unpaid and that each instance of unpaid consumption displaces 0.14 paid consumption instances. Second, a survey of online Chinese consumers reveals similar patterns of paid and unpaid movie consumption but a displacement rate of roughly zero. We speculate on the small displacement rate finding relative to most of the piracy literature.

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## Introduction

It is widely believed that intellectual property piracy is widespread in China and elsewhere in Asia. This has caused great consternation among the countries exporting commercial intellectual property, chiefly the U.S. Especially as it grows wealthy, China could become an important export market for intellectual property. U.S. film studios in particular are concerned about piracy. The Motion Picture Association of America (MPAA) claims that its members lost \$6.1 billion to piracy in 2005, \$4.8 billion internationally, and the MPAA estimates that 90 percent of movies sold in China are pirated copies, stating that the “countries where movie piracy is occurring most prominently are China, Russia, UK, France, Spain, Brazil, Italy, Poland and Mexico.” The U.S. government shares Hollywood’s concern about piracy in China.<sup>1</sup>

Even if intellectual property piracy is widespread in China, it does not follow that paid consumption would have been higher in the absence of unpaid pirate consumption. The amount of paid activity that stealing displaces depends on both the volume of unpaid activity and the rate of displacement of paid for unpaid consumption. A growing body of literature provides estimates of displacement rates for a variety of media (music, movies, video), and available evidence provides a range of displacement rates that vary across media. The smallest displacement rates arise in television, where access to clips on YouTube appear not to

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<sup>1</sup> “The Administration’s top priorities this year continue to be addressing weak IPR protection and enforcement, particularly in China and Russia. Although this year’s Special 301 Report shows positive progress in many countries, rampant counterfeiting and piracy problems have continued to plague China and Russia, indicating a need for stronger IPR regimes and enforcement in those countries.” Under Special 301, the United States Trade Representative “must identify those countries that deny adequate and effective protection for IPR or deny fair and equitable market access for persons that rely on intellectual property protection.” And: “China remains a top intellectual property enforcement and TRIPS compliance priority for the United States. China will remain on the Priority Watch List, and remain subject to Section 306 monitoring.”

cannibalize conventional television viewing.<sup>2</sup> Music provides intermediate displacement estimates, with estimates around a quarter (although some as low as zero).<sup>3</sup> Estimates for movies provide the highest displacement rates: Rob and Waldfogel (2007) find that unpaid movie consumption displaces paid consumption roughly 1:1 in a sample of U.S. college students. They speculate that the high displacement rate arises because movie consumption, even when unpaid, requires hours of undivided attention.

The existing literature has focused largely on developed countries, particularly the U.S. It is not clear whether findings in these contexts are relevant to China, a developing country context with large-scale piracy. This paper seeks to answer that question with a study of the effects of unpaid movie consumption on paid movie consumption among two Chinese populations in 2009. First, we survey a sample of college students analogous to the US student population examined in Rob and Waldfogel (2007, which we refer to as RW below). Second, we survey a larger sample of Chinese Internet users.

The paper proceeds in five sections following the introduction. Section two provides background on the movie industry and piracy in China. Section three provides some theoretical discussion on the effects of piracy on paid consumption. Section four describes our two sources of data. Section five presents empirical results on the sales-displacing effects of unpaid on paid consumption among our samples of Chinese consumers. We speculate on the reasons for our small displacement estimates and conclude.

We find large amounts of unpaid movie consumption in both of our samples: nearly three quarters of movie consumption is unpaid, compared with under a tenth in a US college-student

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<sup>2</sup> See Waldfogel (2009).

<sup>3</sup> See, for example, Oberholzer-Gee and Strumpf (2007), Rob and Waldfogel (2006), Leibowitz (2006), Zentner (2006), among others.

sample. We find mixed but, at most, modest evidence of sales displacement in China. Among the college students we find a statistically significant but small rate of sales displacement. Longitudinal estimates suggest roughly 1:7 displacement, or that each instance of unpaid consumption reduces paid consumption by a seventh. We find no evidence of sales displacement in the general online population surveyed. Both estimates are far smaller than the comparable result for a US college student sample, roughly 1:1 displacement.

## **II. Industry Background and Piracy Issue in China**

### *The Chinese Movie Industry*

Since 1949 China's cultural market has been closed; until recently, the film industry was financed, owned, and controlled by the government. Under government control, filmmakers were not burdened by the need to secure finance or recover production costs at the box office. Since early 1992, as China has undergone economic reform, the government-sanctioned film industry has faced competition from new sources such as video parlors, Karaoke bars, and video piracy. Unable to withstand private competition, the existing industry has withered, and filmmakers have turned to other sources of finance. Privately – and jointly – owned production companies have appeared.<sup>4</sup>

Since 1995, China has engaged in “box office split” (i.e. revenue-sharing) deals on up to ten foreign films, usually ‘blockbusters’. Prior to 1995, foreign films were bought into Chinese market for flat fees of \$30,000 to \$50,000 per film.<sup>5</sup> These were typically outdated and low-

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<sup>4</sup> For detailed introduction of the history of the Chinese film industry, please refer to [www.dfat.gov.au/geo/china/fta/submissions/cfta\\_submission\\_6se05.pdf](http://www.dfat.gov.au/geo/china/fta/submissions/cfta_submission_6se05.pdf)

<sup>5</sup> The copyright is completely bought-out by the film distributor in China for a flat fee.

grade but inexpensive foreign movies.<sup>6</sup> With China's entry into the WTO, the number of foreign films allowed in on a revenue-sharing basis rose from 10 to 20. This number is expected to increase to 40 in the coming years.<sup>7</sup> Most of the foreign films are Hollywood films, followed by films from Hong Kong. The effective quota need not be filled if China determines that films have "improper content."

In 2007, box office revenue in China totaled RMB 3.33 billion (approximately US \$438 million), or \$0.35 per capita, while in the U.S. the box office revenue is \$9.63 billion, or \$32 per capita.<sup>8</sup> Although the scale of the Chinese film industry is rather small compared with U.S., revenue is growing. The box office revenue in 2005 and 2006 totaled U.S. \$250 million and U.S. \$325 million respectively.<sup>9</sup> In total, more than five hundred domestic films were produced in 2007. Among 188 films released in theaters, 140 were domestic films, accounting for only 54.1 percent of total box office revenue; 48 foreign films earned the other 45.9 percent.<sup>10</sup> In 2005, there were 1,216 theaters and 2,530 movie screens in China<sup>11</sup>, while U.S. had 6,114 cinema sites and 37,740 movie screens.

### *Piracy in China*

Piracy, both physical and on the Internet, is considered an important threat to the film industry. According to some observers, no country contributes more to the piracy problem, or will play a more critical role in shaping the future of international piracy, than China (Priest, 2006). Physical piracy has flourished in China and has grown quickly since the early nineties.

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<sup>6</sup> Supra note 4, page 10.

<sup>7</sup> According to the 2008 Research Report on Chinese Film Industry, in 2007 10 films were actually allowed into on a revenue-sharing basis, and 12 on a flat-fee basis; in 2006, 16 on a revenue-sharing basis, and 13 the latter.

<sup>8</sup> See <http://www.natoonline.org>

<sup>9</sup> See <http://www.reuters.com/article/pressRelease/idUS159860+28-Feb-2008+PRN20080228> (in Chinese)

<sup>10</sup> See [http://www.medialeader.com.cn/media/200806/20080624091808\\_19137.html](http://www.medialeader.com.cn/media/200806/20080624091808_19137.html) (in Chinese)

<sup>11</sup> See <http://www.china.com.cn/chinese/zhuanti/whbg06/1120913.htm> (in Chinese)

According to industry estimates, more than 90 percent of all music CDs, movies DVDs and software sold in China are pirated. In 2004, industry estimates of U.S. losses due to piracy in China range from about \$1.85 to \$2.54 billion annually in displaced sales of CDs, DVDs, VCDs and software.<sup>12</sup>

Concern about Internet-based piracy has been heightened as China has grown to account for the world's second-highest number of Internet users. Thousands of websites and numerous peer-to-peer file-sharing networks or FTP services make copyrighted works available for free to Internet users in China.<sup>13</sup> As in the U.S., use of these sites is prominent on college campus, with a large proportion of low-income students and high-speed Internet access. While Chinese consumers do not have officially sanctioned access to many foreign films, they are nevertheless able to view pirated versions online. Many U.S. television programs, such as *Prison Break* and *Lost*, are not officially available in China; but Chinese audiences are able to view episodes at the same time as U.S. audiences through file-sharing networks.

While the West has blamed China's central government for its failure to eliminate the problem, the Chinese government believes it is not obligated to protect the interests of private parties with the same urgency with which it protect its own interests. China has employed gradual reforms, while performing occasional campaigns against infringers in response to pressure from foreign and domestic copyright owners (Priest, 2006).

The Chinese government recently ordered a crackdown on online video and audio content which does not have an individual license. Internet companies must edit or erase such content.<sup>14</sup> While the longer-term effects of the crackdown are not yet clear, a brief look at the most popular

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<sup>12</sup> See footnote 5 of Priest (2006).

<sup>13</sup> See footnote 21 of Priest (2006).

<sup>14</sup> See <http://www.ft.com/cms/s/0/d2452e5a-1fa6-11de-a1df-00144feabdc0.html> on the April 2009 crackdown.

video-sharing websites, like Tudou.com and Youku.com, shows that TV series such as *X-Files*, *24 hours*, etc. had been removed.

Many foreign and domestic film companies have responded to China's IP protection climate with new business strategies. Recently, Warner Bros. announced an experimental online service offering "DRM-protected copies of various Warner Bros. films (including some that have never been released theatrically in China) for a fraction of the rental cost, compared to other parts of the world.... The studio's movies will reportedly be available for rent for a mere 4 to 7 yuan, roughly 60¢ to \$1.03. ... Warner Bros. is trying to compete with street pirates who hawk burned movies on the cheap."<sup>16</sup> In music – and also as a response to piracy - Google has made music available on a fully ad-supported basis.<sup>17</sup>

### III. Theory

The static effects of intellectual property piracy on both legal sales and welfare can be described with a simple demand model (Figure 1). First consider a context in which the product has a zero marginal cost and a positive price, but piracy is not possible. Then the area under the demand curve is divided into revenue, consumer surplus, and deadweight loss (Figure 1.1).

When piracy is feasible, the demand for legal products changes. But the nature of the change depends on whether the instances of demand manifesting themselves as pirate consumption would otherwise have manifested themselves as legal purchases. For example, if the low-valuation demanders – formerly resulting in deadweight loss – now consume pirate products, then piracy raises welfare without reducing revenue (Figure 1.2). On the other hand, if

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<sup>16</sup> See <http://arstechnica.com/old/content/2008/11/warner-bros-to-fight-china-movie-piracy-with-60-downloads.ars>

<sup>17</sup> See Barboza, David. "Google and Music Labels Bet on Downloads in China." New York Times, April 6, 2009.

consumers with high valuations of the product – who would formerly have purchased legally – now consume pirate copies, then revenue falls (Figure 1.3).

For the static problem, piracy increases welfare. Either valuations that were formerly shared between consumer surplus and revenue now become simply consumer surplus. Or (low) valuations that were formerly deadweight loss become consumer surplus.<sup>18</sup>

Piracy can, in principle, also stimulate the demand for paid consumption. Shapiro and Varian (1999) emphasize the possible effect of sampling on paid demand. Bakos, Brynjolffson, and Lichtman (1999) and Varian (2000) articulate theories in which file-sharing need not reduce paid demand and may increase it, particularly if sharing remains small in scale.

Another consideration is that there are several sources to generate revenue for movie industry, like rentals, box office sales, royalties for showing the movie on television, and DVD sales. Some consumers watch the movies several times. Therefore, it is possible that unpaid consumption may stimulate further paid consumptions; on the contrary, an unpaid consumption may displace several paid consumptions as well (Rob and Waldfogel, 2007).

The key point that this analysis highlights, however, is that piracy can cause anywhere between a 1:1 displacement of revenue and no effect (and, possibly, even a stimulating effect). Put another way, the effect of piracy is an empirical question that we seek to address.

#### **IV. Data**

The data for this study come from two surveys administered in China. The first survey was administered to students Peking University in late 2008. The second survey was

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<sup>18</sup> A dynamic analysis – outside the scope of this study – would be different. If revenue does not cover the cost of production, then the product won't come into existence in the first place.



administered to a sample of Chinese Internet users in July 2009. We describe these data sources in turn.

### *College Student Sample*

The college student sample comes from a paper survey administered on the campus of a Peking University in December of 2008. The survey was given to 372 students in two classes. The basic data set resulting from the survey is an individual-level panel on legal and illegal movie consumption of movies released 2006-2008.

For the survey, each student was shown lists of 50 movies from each of the past three years. For each movie, respondents were asked to indicate whether they had seen it, by each paid and unpaid modes (theater, rented DVD, downloaded,...), and in what order. So, for example, if they first saw the movie in a theater, then later watched a pirated DVD, they would indicate “1” under theater and “2” under pirated DVD for that movie. The list of 50 movies from each year included the 20 foreign movies allowed into China per year, as well as 20<sup>19</sup> domestic (Chinese) movies, and 10 additional foreign movies not legally allowed in Chinese theaters, which we refer to as “unauthorized films” below.<sup>20</sup>

In addition to movie consumption, the survey asked the students to report their interest in movies by a scale from 1 to 5 (whether their interest in movies was “a lot more,” “a little more,” “about the same,” “a little less,” or “a lot less” than their peers), and to indicate how often they go to theater. The survey also asks about family income, gender, age, and Internet access (over the past three years).

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<sup>19</sup> In the 2006 sample, there are 19 foreign authorized films, 15 domestic movies and 16 unauthorized movies; while in 2007, there are 21 foreign authorized films, 19 domestic films and 10 unauthorozied.

<sup>20</sup> A few of so-called unauthorized films are allowed into Chinese markets in the form of DVD, VCD, or even Blu-ray, usually several months after releasing in China.

The first column of Table 1 summarizes the college student respondent characteristic data. Respondents average 20.2 years of age, and 50 percent are between 19.75 and 21. Just over half (52 percent) are female. Nineteen percent report annual family income of less than \$2,930, 32 percent report \$2,930-\$7,320, 29 percent report \$7,320-\$14,640, \$14,640-\$29,280, and 5 percent report more. Only seven percent report below-typical levels of interest in movies, while 44 percent report typical, 36 percent report more than typical, and 14 percent report far more than typical. Over half (55 percent) report never going to the theater, while 39 percent report going once a month or less, and 6 percent report going more often. High-speed Internet access is nearly ubiquitous: 99 percent report having had it in 2008, 96 percent in 2007, and 80 percent in 2006.

Table 2 summarizes movie consumption among the college student respondents. As the first (“all viewings”) column indicates, respondents had viewed movies among the 150 in the survey a total of 31 times. (These are viewings rather than movies, since some of the respondents view some of the movies multiple times). Of these viewings, three quarters (23 of 31) were unpaid. The vast majority of viewings – 96 percent – are first-time viewings. That is, these respondents do not typically see movies a second or third time, while in the U.S. sample analyzed in RW, first viewings make up only 78 percent.

The vast majority of the unpaid viewings are obtained via downloading: downloaded movies make up three quarters of unpaid consumption and over half of consumption overall. Theatrical consumption makes up a fifth of overall consumption and over 80 percent of legal consumption.

### *Internet User Sample*

Our Internet user sample was collected through a major online paid survey community in China. While our data license prevents us from disclosing the identity of the company (which we term “community C”), community C has one million registered users. These users are compensated for survey participation, providing them an incentive to stay online and respond regularly to surveys. We posted our survey during a two-week period in July of 2009 and obtained data on 3,852 individuals.

Our sample is fairly representative of registered participants in community C. According to company reports on community C, males account for 66 percent of registered users and 63 percent of our sample. The majority of registered users – just over 60 percent - at community C are between 18 and 30. A similar percentage of our online sample falls into the same age range. Our Internet users are also at least roughly representative of Chinese Internet users overall. According to a reports issued by China Internet Network Information Center (CNNIC), males accounted for 57 and 53 percent of Internet users in 2007 and 2008, respectively, somewhat below their share in our sample (63 percent). Our respondents are somewhat younger than typical Chinese Internet users: nearly 90 percent of our respondents are between 20 and 40 years old, compared with just over half of the Chinese Internet-connected population. Finally, our sample has somewhat higher income than typical Internet users: nearly 60 percent of Internet-connected individuals have lower monthly income (below \$220), compared with only 15 percent for our online sample.

While our student sample covers respondents in a narrow age range, our Internet user sample covers a much wider range. Half of our online survey respondents are between 25 and 33 (compared with an inter-quartile range of 19.8-21 for the students).

Because college students may report either their own or their parents' incomes as "family income," it is difficult to compare their reported income with the reported income of the Internet user sample. Still, as Table 1 shows, the distributions of income are fairly similar between our two populations.

Compared to the student sample, the online sample is less likely to have broadband. While nearly all of the students (99 percent) had broadband in 2008, only 87 percent of the online sample had broadband in 2008. Of the online population, 82 percent report owning a DVD burner, compared with 64 percent of the students. Reported interest in movies is higher in the online sample than among students: 78 percent report above-average interest in movies, compared with 49 percent among students. Finally, online respondents report more frequent theater-going: nearly half report going to theaters more than twice a month, compared with only 6 percent of the students.

Paid and unpaid movie consumption is broadly similar for our college student and online samples, and both differ substantially from the US college students in RW. While our college student respondents had an average (median) of 8 (5) movie viewings by paid means and 23 (18) by unpaid means, our online respondents had an average of 12 paid viewings among an average of 33 overall viewings. Unpaid viewings make up the majority of movie viewings among both populations. This is starkly at odds with survey results based on US college students in Rob and Waldfogel (2007). First, US college students watch far more movies. Given a list of 150 movies – the top 50 in each of the preceding three years – respondents had viewed movies 57 times. Second, the vast majority of US consumption was legal: of the 57 viewings, 54 of these legal.

According to Table 3 describing the college students, of the 23 unpaid consumption episodes, 10.7 were Chinese movies, 9.3 were legal foreign movies, 3 were illegal foreign

movies. Of the 8 paid movies, 4.4 were legal domestic, 3.4 were legal Hollywood, and 0.2 were illegal foreign movies. Table 4 describes the online sample. This population has similar patterns. Domestic authorized movies occupy the largest share, followed by foreign authorized movies. Unpaid consumption of foreign unauthorized movies accounts for roughly a tenth of movie viewings in these samples.

## **V. Empirical Strategy and Results**

We ask two broad questions. First, descriptively, what are the determinants of paid and unpaid movie consumption? Part of the motivation is to find plausible sources of exogenous variation in unpaid movie consumption that can be used to identify the sales displacement effect of unpaid on paid consumption. Second, we seek to measure the displacement rate: how much does an instance of unpaid movie consumption displace paid movie consumption in China? We pose the latter displacement question using both cross sectional and longitudinal approaches, applied to the two data sets.

### *Determinants of Movie Consumption*

We create simple cross-section datasets indicating the total number of movies watched – by each of the paid and unpaid means – by each individual, along with the individual’s characteristics. Table 5 uses regressions to describe how paid and unpaid movie consumption varies across respondents in the two samples. The first two columns report regressions on the student sample. Both paid and unpaid consumption rise sharply in self-reported interest in movies: those reporting the highest level of interest watch 9 more paid and 34 more unpaid

movies than those reporting the lowest level of interest. Paid consumption rises with family income, and unpaid consumption falls – although not statistically significantly – with income. Men watch substantially more – 11 more – unpaid movies, while women watch 2 more paid movies.

The latter two columns of Table 5 report regression results for the Internet user sample. Here too paid consumption rises systematically with interest in movies and with income. Unpaid consumption rises sharply in movie interest and falls sharply in income. As with the college students, men watch more paid movies and fewer unpaid movies than women.

### *Displacement*

The most basic way to measure sales displacement is simply by asking whether respondents who have more unpaid instances of movie consumption have fewer paid instances. An immediate problem with this approach is that people who like movies may like them both paid and unpaid, which would give rise to a positive correlation, even if no complementary relationship exists. What's needed, in principle, is a measure of interest in movies. Conditional on a respondent's level of interest in movies, the question is whether those who do more unpaid viewing do less paid viewing.

The first 5 columns of Table 6 report cross sectional regressions of paid consumptions on unpaid consumptions and controls for the college student sample. In column (1), a regression of paid viewing on unpaid consumption yields a coefficient of -0.015 that is insignificantly different from zero. Including dummies for self-reported level of interest in movies and income levels changes the displacement coefficient to -0.066, which is three times the absolute value of its standard error. This estimate implies sales displacement of 15:1. These results are robust to the

inclusion of other covariates, or interaction terms with interest (column 4 and 5). Yet, because our measure of interest in movie is likely imperfect, the true level of displacement is probably higher.

The latter half of Table 6 (columns 6-10) repeats the exercise of the first half using the Internet user survey. Most variables enter with similar signs and magnitudes in the online sample. The coefficients on the movie interest dummies are monotonically increasing, as are the movie attendance coefficients. However, with these data, the displacement coefficient is precisely estimated to be near zero.

Although we have direct measures of interest in movies among the variables in the data (interest in movies, frequency of theater attendance, etc), there is still a possibility that unobserved determinants of movie consumption will contaminate the cross sectional approach. If the approach is biased toward producing positive coefficients – or, equivalently, biased toward producing evidence against sales displacement – then findings of negative and zero displacement have rather different interpretations. A negative estimated coefficient in a context biased toward positive findings is informative, suggesting that the true rate of displacement is even more negative. A positive estimated coefficient, while on its face suggestive of a stimulating relationship between unpaid and paid consumption is less informative: it simply means that the true relationship is less positive than the estimated relationship.

A second approach to measuring sales displacement exploits the panel nature of the data to deal with fixed unobserved heterogeneity. Define  $P_{iv}$  as the number of movies from vintage  $v$  that person  $i$  consumes via paid means, and define  $U_{iv}$  analogously. Then:

$$P_{iv} = \alpha U_{iv} + X_{iv}\beta + \mu_i + \mu_v + \varepsilon_{iv},$$

where  $\mu_i$  is an individual fixed effect and  $\mu_v$  is a vintage effect. The coefficient  $\alpha$  measures displacement by asking whether a person has more or fewer paid consumptions from vintages in which they have more unpaid consumptions, after accounting for the average vintage effect (movies released that year are more popular) and the individual's fixed effect (reflecting his time-constant taste for movies). The vector  $X$  contains time-varying individual characteristics, such as class year and age. Column (1) in Table 7 reports results for the college student sample. Note that an observation in this setup is an individual-vintage pair. That is, the dependent variable is, for example, the individual's number of paid viewings of movies released in 2006. Using all of the college student data, the displacement rate is -0.135, meaning that one unpaid consumption displaces one seventh of a paid consumption.

Pooling all movies is potentially misleading, since illegal movies are not available for paid consumption. Therefore, we further look at the displacement rate within legal foreign and legal domestic movies separately in column (2) and (4). The displacement rate for legal foreign movies is slightly smaller than the rate overall, about 1:7.4. The displacement rate for domestic movies is higher, at 1:5.6.

The above specification assumes there are no displacement effects across movie types. To relax this assumption, in column (3) and (5), we examine how the unpaid consumptions of three types of movies affect the paid consumptions of legal foreign and legal domestic movies. These two exhibit opposite patterns. Unpaid foreign legal consumption displaces paid foreign legal consumption at a rate of -0.124, while unpaid domestic consumption displaces paid foreign legal consumption at about -0.043. Similarly, the within-type displacement rate of paid domestic consumption is -0.197, while the across-type displacement rate is positive, 0.063. Taken



literally, the positive coefficient implies that unpaid consumption of foreign movies stimulates paid consumption of domestic movies, although the coefficient is small in magnitude.

The latter half of Table 7 repeats the longitudinal estimation exercise with the Internet user sample. The overall displacement estimate, which was -0.14 in the college student sample, is 0.005 (and insignificantly different from zero, in column 6) for the Internet users. Other estimates vary between 0.05 and -0.07, and while some are statistically discernible from zero, none are far from zero. These estimates stand in fairly sharp contrast with the US estimates in RW. The longitudinal approach yields an estimate of 1:1 displacement, compared with the estimates here that lie between zero and -0.14.

## **VI. Concluding Discussion**

While an analogous study including a comparable US population finds a large sales displacement rate, we find rather different results for Chinese consumers. First, the Chinese respondents view fewer movies (30 vs 50 from a comparable list). Second, unpaid consumption makes up a far larger share of consumption for the Chinese respondents (roughly three quarters rather than about 5 percent). Third, econometric estimates of sales displacement are far smaller for the Chinese samples. While the US estimates based on the longitudinal approach employed above indicate roughly 1:1 displacement, the estimates on the Chinese data in this study are between 0 and -0.14.

These results, on their face, suggest small damages from movie piracy in China despite large volumes of unpaid consumption. Before drawing this conclusion, however, it is important to understand the reason for the stark difference between results for the US and China. We can offer some speculation along these lines.

One possible explanation for the low Chinese displacement rate – suggested by lower overall movie consumption in China – is that Chinese students’ time budgets are not as strained as the U.S. students’. A relaxed time budget could accommodate additional unpaid consumption without reducing paid consumption. Related, those spending additional time with unpaid movies may be scaling back the time they spend with other non-moviegoing activities, such as television or reading.

A second possible explanation is that unpaid consumption of movies released between 2006 and 2008 does not come at the expense of a pre-existing tendency for consumers to pay for movies in China. That is, US audiences have generally paid for their movies, and recent opportunities for unpaid consumption represent a change. The response to this change in the US sample has been a replacement of paid by unpaid consumption. It is possible that in China, by contrast, unpaid consumption has a longer history, and the period under study may not contain a change in unpaid consumption opportunities. Rather than substituting unpaid for paid consumption, Chinese respondents may simply be substituting one form of unpaid consumption for another, which would show up as zero sales displacement.

Additional studies of sales displacement from piracy will be useful for determining whether the differing displacement patterns for the US and China withstand additional scrutiny. If so, then determining which of these explanations, if any, explains the conflicting results is an important topic for future research.

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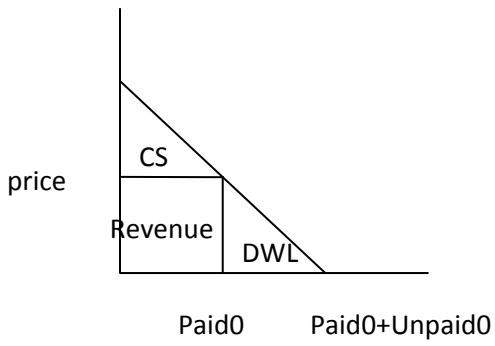
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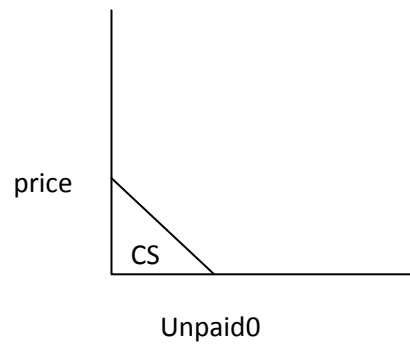
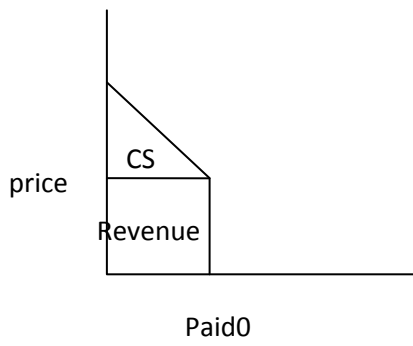
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Figure 1

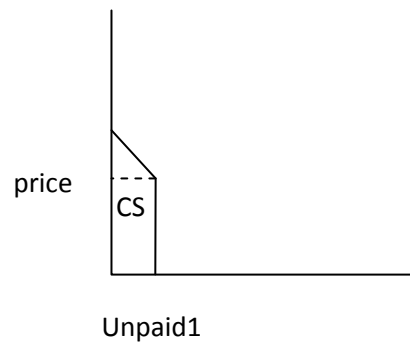
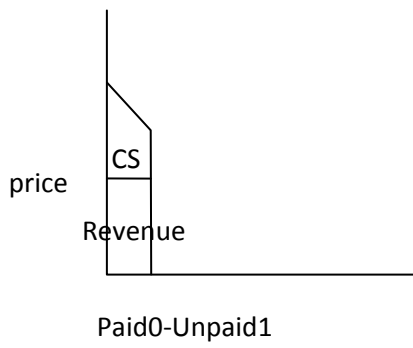
1.1: No unpaid consumption



1.2: Paid and unpaid consumptions: low valuation



1.3: Paid and unpaid consumptions: high valuation



**Table 1: Summary of Respondents' Characteristics**

Background Characteristics	Student Sample (obs=372)	Online Sample (obs=3852)
<b>Gender</b>		
Female	51.6%	37.0%
Male	48.4%	63.0%
<b>Age</b>		
	(17--30)	(11--68)
Mean	20.23	29.56
25 percentile	19.75	25
Median	20	28
75 percentile	21	33
<b>College Year</b>		
Freshman	0.54%	-
Sophomore	43.1%	-
College junior	46.1%	-
College Senior	9.8%	-
<b>Annual Family Income/ Monthly Income*</b>		
Below \$2930/below \$220	18.8%	14.8%
\$2930-7320/\$220-440	31.8%	35.3%
\$7320-14640/\$440-730	29.2%	28.2%
\$14640-29280/\$730-1020	15.6%	10.4%
Above \$29280/above \$1020	4.6%	11.2%
<b>Computer</b>		
Have no computer or regular access	0%	0.18%
Own computer or have regular access	100%	99.82%
<b>Internet Access in 2008</b>		
No internet access	0.27%	0.88%
Dial-up	0.82%	12.5%
Broadband	98.9%	86.6%
<b>Internet Access in 2007</b>		
No internet access	0.28%	2.88%
Dial-up	3.64%	14.7%
Broadband	96.1%	82.5%
<b>Internet Access in 2006</b>		
No internet access	12.0%	7.53%
Dial-up	7.45%	16.7%
Broadband	80.5%	75.8%
<b>DVD/VCD Burner</b>		
Yes	63.6%	81.7%
No	36.4%	18.3%
<b>Interest in Movies**</b>		
A lot less	1.62%	0.23%
A bit less	5.39%	0.47%
Average	43.7%	21.6%
A bit more	35.6%	51.6%
A lot more	13.8%	26.2%
<b>Frequency to Movie Theaters</b>		
Never	55.3%	16.1%
Once a month or less	38.5%	37.1%
Two or three times a month	6.2%	34.5%
More than three times a month	0%	12.4%

Notes: \* Student sample is asked about annual family income, and online sample monthly income; Chinese currency is converted to US dollars.

\*\* the questions is phrased as 'Compared to other people you know, how big a movie fan are you?'

**Table 2: Respondent Movie Viewings, by Mode (Student sample)**

	All	First	Second	Third
	<b>viewings</b>			
<b>Paid</b>	<b>8.0</b>	<b>7.7</b>	<b>0.2</b>	<b>0.0</b>
Theater	6.7	6.5	0.1	0.0
Legally purchase	0.1	0.1	0.0	0.0
TV	0.8	0.8	0.1	0.0
Rental	0.4	0.3	0.0	0.0
<b>Unpaid</b>	<b>23.1</b>	<b>22.2</b>	<b>0.8</b>	<b>0.1</b>
Download	17.8	17.3	0.5	0.0
Online/burned DVD	3.9	3.7	0.3	0.0
Borrow	0.5	0.5	0.0	0.0
Illegally purchase	0.8	0.7	0.1	0.0
<b>Total</b>	<b>31.1</b>	<b>29.9</b>	<b>1.0</b>	<b>0.1</b>

**Table 3: Respondent Movie Viewings, by Movie Type  
Student Sample**

	<b>Total</b>	<b>Foreign Authorized Movies</b>	<b>Domestic Authorized Movies</b>	<b>Unauthorized Movies</b>
<b>Paid</b>	<b>8.0</b>	<b>3.37</b>	<b>4.41</b>	<b>0.21</b>
Theater	6.7	2.98	3.61	0.10
Legally purchase	0.1	0.07	0.05	0.01
TV	0.8	0.19	0.59	0.04
Rental	0.4	0.13	0.17	0.05
<b>Unpaid</b>	<b>23.1</b>	<b>9.32</b>	<b>10.73</b>	<b>3.02</b>
Download	17.8	7.19	8.34	2.30
Online/burned DVD	3.9	1.56	1.87	0.52
Borrow	0.5	0.21	0.21	0.07
Illegally purchase	0.8	0.37	0.31	0.13
<b>Total</b>	<b>31.1</b>	<b>12.69</b>	<b>15.15</b>	<b>3.23</b>



**Table 4: Respondent Movie Viewings, by Movie Type  
Online Sample**

	<b>Total</b>	<b>Foreign Authorized Movies</b>	<b>Domestic Authorized Movies</b>	<b>Unauthorized Movies</b>
<b>Paid</b>	<b>11.52</b>	<b>3.98</b>	<b>6.42</b>	<b>1.11</b>
Theater	5.99	2.31	3.15	0.54
Legally purchase	1.67	0.63	0.82	0.22
TV	2.80	0.64	1.95	0.20
Rental	1.06	0.40	0.50	0.16
<b>Unpaid</b>	<b>21.88</b>	<b>7.88</b>	<b>10.99</b>	<b>3.01</b>
Download	10.33	3.70	5.20	1.43
Online/burned DVD	9.78	3.54	4.91	1.33
Borrow	0.82	0.28	0.43	0.11
Illegally purchase	0.94	0.36	0.45	0.13
<b>Total</b>	<b>33.40</b>	<b>11.86</b>	<b>17.42</b>	<b>4.13</b>

**Table 5: Paid and Unpaid Movie Consumption**

	Student Sample		Online Sample	
	Paid (1)	Unpaid (2)	Paid (3)	Unpaid (4)
Movie Interest Category 2	2.368 (3.967)	7.369 (7.221)	-1.291 (5.641)	1.891 (8.111)
Interest Category 3	3.834 (3.555)	19.23 (6.472)**	2.935 (4.632)	9.690 (6.660)
Interest Category 4	7.204 (3.582)*	26.20 (6.520)**	7.757 (4.620)	18.423 (6.644)**
Interest Category 5	9.558 (3.704)*	34.06 (6.742)**	11.584 (4.634)*	22.247 (6.664)**
Female	2.359 (0.993)*	-11.22 (1.807)**	1.174 (0.464)*	-5.898 (0.667)**
Have DVD burner	0.745 (1.009)	-0.182 (1.836)	1.958 (0.593)**	2.254 (0.853)**
Income Category 2	-0.251 (1.3560)	0.790 (2.468)	1.753 (0.692)*	-2.569 (0.995)**
Income Category 3	1.848 (1.405)	-1.577 (2.557)	4.113 (0.721)**	-5.981 (1.037)**
Income Category 4	2.639 (1.638)	-4.261 (2.982)	5.973 (0.914)**	-8.722 (1.314)**
Income Category 5	5.990 (2.477)*	4.683 (4.509)	4.425 (0.898)**	-14.290 (1.292)**
College Sophomore	4.462 (6.101)	-1.788 (11.10)	-	-
College Junior	5.195 (6.087)	1.520 (11.079)	-	-
College Senior	4.569 (6.227)	-3.407 (11.33)	-	-
Beyond College	6.392 (8.583)	-10.42 (15.62)	-	-
Constant	-5.071 (6.963)	7.459 (12.67)	-1.070 (4.626)	9.908 (6.653)
Observations	335	335	3852	3852
R-squared	0.15	0.27	0.08	0.10

Note: Standard errors in parentheses. \* significant at 5%; \*\* significant at 1%

**Table 6: Cross Sectional Regressions with Different Observables**

	Paid Consumption									
	Student Sample					Online Sample				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Unpaid Consumptions</b>	-0.015 (0.024)	-0.060 (0.021)**	-0.066 (0.022)**	-0.052 (0.025)*	-0.051 (0.025)*	0.003 (0.010)	0.006 (0.009)	0.006 (0.009)	0.009 (0.009)	0.009 (0.010)
Movie Interest Category 2		2.287 (3.261)	2.465 (3.189)	2.430 (3.238)	3.904 (3.912)		-1.045 (4.751)	-0.978 (4.743)	-0.970 (4.741)	-2.944 (5.819)
Interest Category 3		2.494 (2.947)	2.881 (2.895)	2.559 (2.951)	2.744 (3.627)		1.526 (3.907)	1.447 (3.900)	1.389 (3.899)	0.605 (4.783)
Interest Category 4		4.827 (2.993)	5.181 (2.944)	4.642 (3.013)	5.321 (3.743)		3.803 (3.906)	3.684 (3.898)	3.635 (3.897)	2.627 (4.776)
Interest Category 5		7.318 (3.147)*	7.855 (3.099)*	7.404 (3.164)*	8.945 (3.951)*		5.153 (3.922)	5.052 (3.915)	5.042 (3.914)	0.000 (0.000)
Once per month		6.366 (0.794)**	6.505 (0.817)**	6.383 (0.849)**	6.420 (0.852)**		3.247 (0.565)**	3.121 (0.568)**	3.054 (0.569)**	3.084 (0.570)**
2-3 times per month		16.019 (1.566)**	16.418 (1.612)**	16.349 (1.637)**	16.265 (1.645)**		9.460 (0.593)**	9.193 (0.608)**	9.127 (0.608)**	9.161 (0.610)**
Above 3 times per month	-	-	-	-	-		12.957 (0.757)**	12.943 (0.791)**	12.860 (0.792)**	12.912 (0.794)**
Income Category 2			0.294 (1.075)	0.247 (1.102)	0.123 (1.109)			0.283 (0.584)	0.353 (0.585)	0.358 (0.586)
Income Category 3			1.291 (1.106)	1.277 (1.141)	1.215 (1.151)			1.585 (0.613)**	1.678 (0.615)**	1.670 (0.616)**
Income Category 4			0.899 (1.300)	0.723 (1.332)	0.796 (1.340)			1.971 (0.781)*	2.090 (0.783)**	2.085 (0.784)**
Income Category 5			4.459 (1.939)*	4.687 (2.037)*	4.372 (2.056)*			-0.540 (0.791)	-0.456 (0.792)	-0.479 (0.793)
College Sophomore				2.371 (4.963)	2.621 (4.999)	-	-	-	-	-
College Junior				2.690 (4.959)	2.954 (4.998)	-	-	-	-	-
College Senior				1.824 (5.079)	2.025 (5.122)	-	-	-	-	-
Beyond College				5.640 (7.015)	5.880 (7.042)	-	-	-	-	-
Female				0.807 (0.851)	2.721 (6.028)				0.710 (0.394)	-1.885 (8.222)
Constant	8.120 (0.719)**	1.806 (2.856)	0.912 (2.910)	-1.813 (5.701)	-2.640 (6.080)	10.353 (0.295)**	0.573 (3.879)	0.122 (3.888)	-0.165 (3.890)	0.693 (4.761)
With Interaction Terms	No	No	No	No	Yes	No	No	No	No	Yes
Observations	372	370	344	338	338	3852	3852	3852	3852	3852
R-squared	0.00	0.35	0.39	0.40	0.40	0.00	0.15	0.16	0.16	0.16

Note: Standard errors in parentheses. \* significant at 5%; \*\* significant at 1%. In column (5) and (10), we include interest and gender interaction terms. Including other interaction terms with interest gives very similar results, which are not shown in this table.

**Table 7: Longitudinal Displacement Estimates**

	Student Sample					Online Sample				
	Paid Consumption	Paid Consumption (Foreign Films)		Paid Consumption (Domestic Films)		Paid Consumption	Paid Consumption (Foreign Films)		Paid Consumption (Domestic Films)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unpaid Consumption	-0.135 (0.024)**					0.005 (0.008)				
Unpaid Consumption (Foreign Authorized Films)		-0.135 (0.025)**	-0.124 (0.026)**		0.068 (0.027)*		0.018 (0.009)*	0.011 (0.009)		0.049 (0.011)**
Unpaid Consumption (Domestic Authorized Films)			-0.043 (0.025)	-0.179 (0.026)**	-0.197 (0.026)**			0.004 (0.008)	-0.057 (0.010)**	-0.069 (0.010)**
Unpaid Consumption (Unauthorized Films)			-0.066 (0.049)		0.056 (0.052)			0.057 (0.015)**		0.018 (0.019)
2007 Vintage	0.085 (0.584)	0.437 (0.356)	0.365 (0.357)	-0.301 (0.376)	-0.306 (0.376)	-0.245 (0.131)	0.206 (0.073)**	0.219 (0.073)**	-0.454 (0.092)**	-0.460 (0.092)**
2008 Vintage	-0.235 (1.133)	0.040 (0.690)	-0.113 (0.692)	-0.311 (0.731)	-0.322 (0.728)	0.883 (0.245)**	0.303 (0.136)*	0.305 (0.136)*	0.639 (0.171)**	0.628 (0.171)**
Observations	1071	1071	1071	1071	1071	11556	11556	11556	11556	11556
R-squared	0.005	0.008	0.008	0.025	0.041	0.11	0.05	0.05	0.13	0.14

Note: All regressions include individual fixed effects and age dummies; column (1)-(5) include grade dummy as well. Standard errors in parentheses. \* significant at 5%; \*\* significant at 1%.

**List of 150 Movies in the Online Sample and its Box Office Revenue (in U.S. dollar)**

2008		2007		2006				
<b>Panel A: Foreign Authorized Films</b>								
1	Kung Fu Panda	26,024,298	51	Transformers	37,218,823	101	The Da Vinci Code	14,764,691
2	Quantum of Solace	21,009,412	52	Harry Potter and the Order of the Phoenix	19,410,000	102	Mission: Impossible III	11,817,589
3	The Mummy: Tomb of the Dragon Emperor	17,450,787	53	Spider-Man 3	18,924,747	103	Poseidon	9,775,043
4	Iron Man	15,274,332	54	Pirates of the Caribbean: At World's End	16,970,000	104	Superman Returns	9,019,301
5	Hancock	15,093,944	55	Royal Casino	11,770,398	105	The Chronicles of Narnia: The Lion, the Witch and the Wardrobe	8,806,292
6	The Chronicles of Narnia: Prince Caspian	12,522,570	56	Night at the Museum	8,319,134	106	Garfield: A Tale of Two Kitties	8,228,543
7	10,000 B.C.	10,851,097	57	TMNT	4,819,908	107	Eight Below	7,970,307
8	Wanted	10,747,059	58	Eragon	4,392,922	108	Ice Age 2: The Meltdown	5,190,985
9	National Treasure 2: Book of Secrets	9,951,598	59	Live Free or Die Hard	3,979,257	109	Transporter II	4,432,325
10	Journey to the Center of the Earth	9,923,386	60	Daja Vu	3,800,000	110	Miami Vice	4,267,463
11	The Incredible Hulk	8,929,638	61	Ghost Rider	3,759,994	111	When A Stranger Calls	3,501,508
12	The Water Horse: Legend of the Deep	8,752,718	62	Shooter	3,245,468	112	Firewall	3,231,600
13	Bolt	6,578,259	63	The Guardian	3,157,013	113	World Trade Center	3,227,223
14	Flood	6,126,825	64	Mr. Bean's Holiday	3,048,163	114	X-Men: The Last Stand	3,129,473
15	The Golden Compass	4,928,803	65	The Bourne Ultimatum	3,026,471	115	Cars	3,129,473
16	D-War	4,370,573	66	Ratatouille	2,871,850	116	The Sentinel	3,063,819
17	Speed Racer	3,184,713	67	Doraemon The Movie	2,682,446	117	Empire of Wolves	2,399,992
18	Vinci	2,891,421	68	Tristan & Isolde	2,569,673	118	Lasko	2,013,367
19	Hellboy II: The Golden Army	2,366,875	69	The Devil Wears Prada	2,401,750	119	Open Season	-
20	Next	2,308,086	70	Prey	2,206,479	120	Racing Stripes	-
<b>Panel B: Domestic Authorized Films</b>								
21	Red Cliff	46,698,967	71	Assembly	34,089,912	121	Curse of the Golden Flowers	42,820,523
22	If you are the One	45,257,457	72	The Warlords	27,601,246	122	The Banquet	18,251,610
23	Painted Skin	33,467,300	73	Lust, Caution	17,109,185	123	Fearless	14,823,050
24	The Forbidden Kingdom	26,899,556	74	Protégé	8,069,097	124	Bo bui gai wak	13,422,447
25	A Hope (CJ7)	26,166,803	75	Invisible Target	4,482,709	125	Confession of Pain	10,840,085
26	Forever Enthralled	16,652,957	76	Secret	4,407,852	126	Battle of Wits	8,972,614
27	Kung Fu Dunk	15,883,165	77	Flash Point	4,090,789	127	Dragon Tiger Gate	7,484,473
28	Ip Man	13,728,640	78	Blood Brothers	3,944,291	128	The Knot	5,252,262
29	Three Kingdoms-Resurrection of the Dragon	9,331,504	79	Brothers	3,860,900	129	Tokyo Trial	3,501,508
30	Almost Perfect	6,855,809	80	Triangle	3,616,637	130	Crazy Stone	3,282,664
31	Connected	6,427,392	81	The Secret of the Magic Gourd	2,725,713	131	Ngor fu	1,779,933
32	An Empress and The Warriors	6,147,279	82	The Sun Also Rises	2,130,247	132	The Forest Ranger	992,094
33	Fit Lover	4,800,559	83	Contract Lover	1,860,515	133	One Foot Off The Ground	802,429
34	Desires of the Heart	4,509,616	84	Twins Mission (Let's steal together)	1,676,554	134	Curiosity Kills the Cat	729,481
35	Storm Rider - Clash of Evils	4,382,825	85	Getting Home	1,675,150	135	The Music Box	-
36	Butterfly Lovers	4,301,830	86	Naraka 19	1,647,884	136	The Road	145,896
37	All about Women	3,331,872	87	Ai qing hu jiao zhuan yi	1,547,449	137	The Jimmy Hat	58,358
38	Missing	3,330,558	88	The Matrimony	1,418,495	138	Dreams May Come	58,358
39	Lady Cop & Papa Crook	2,571,032	89	Lost in Beijing	1,286,914	139	Still Life	58,358
40	Sparrow	2,479,761	90	Dangerous Games	1,237,539	140	Yuan Ming Yuan	-
<b>Panel C: Unauthorized Films</b>								
41	The Dark Knight	7,549,781	91	I Am Legend	2,791,588	141	Pirates of the Caribbean: Dead Man's Chest	4,574,736
42	Indiana Jones and the Kingdom of the Crystal Skull	3,518,898	92	Fantastic Four: Rise of the Silver Surfer	2,414,398	142	Death Note: The Last Name	1,837,633
43	The Day the Earth Stood Still	2,487,864	93	AVPR: Aliens vs Predator - Requiem	1,916,003	143	Election 2	1,739,442

44	Wall-E	2,245,445	94	Ocean's Thirteen	1,566,989	144	Over the Hedge	1,735,406
45	Twilight	2,213,774	95	Evan Almighty	1,478,372	145	Brokeback Mountain	1,426,575
46	Sex and the City: The Movie	2,020,222	96	Resident Evil: Extinction	1,389,420	146	McDull, the Alumni	1,360,023
47	L for Love, L for Lies	1,602,812	97	The Simpsons Movie	1,334,093	147	2 Become 1	1,312,395
48	Suspect X	1,591,161	98	The Holiday	1,254,680	148	Shopaholics	1,262,715
49	Mamma Mia!	1,565,382	99	Beowulf	1,134,834	149	My Wife Is a Gangster 3	1,172,133
50	Jumper	1,438,941	100	Blood Diamond	1,119,267	150	Fun with Dick and Jane	1,137,110

Notes:

1. In each year, we have a list of 50 films, including 20 authorized foreign films, 20 domestic films, and 10 unauthorized films.
2. Box Office Mojo (<http://www.boxofficemojo.com/>) provides yearly box office revenue data in China since 2007, so authorized films, foreign and domestic, coded by 1-40 and 51-90, have consistent box office revenue data in Chinese market. Box office revenue data in 2006 are collected and compiled from online sources, and are converted to U.S. dollar. Since the sources are different between 2008, 2007 and 2006, comparison across years should be taken with caution.
3. Unauthorized films entered Chinese market through unofficial channels. Ten films are chosen each year according to their popularity, measured by box office revenue in Hong Kong. In other words, these films are top ten best-selling films which are not allowed in mainland China. People in Hong Kong and mainland China share similar language and culture, so we expect their preference for films are alike. However, their constraints differ, in the sense that film industry in Hong Kong submits to no import quota ([http://en.wikipedia.org/wiki/Movie\\_industry#Hong\\_Kong](http://en.wikipedia.org/wiki/Movie_industry#Hong_Kong)), while mainland China would allow 20 foreign films per year to be released, on a revenue-sharing basis between the cinemas and the studios. Productions with “improper content” are prohibited as well.

**List of 150 Movies in the Student Sample and its Box Office Revenue (in U.S. dollar)**

2008		2007		2006				
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3	The Mummy: Tomb of the Dragon Emperor	17,450,787	53	Harry Potter and the Order of the Phoenix	19,410,000	103	Mission: Impossible III	11,817,589
4	Iron Man	15,274,332	54	Pirates of the Caribbean: At World's End	16,970,000	104	Poseidon	9,775,043
5	Hancock	15,093,944	55	Royal Casino	11,770,398	105	Superman Returns	9,019,301
6	The Chronicles of Narnia: Prince Caspian	12,522,570	56	Night at the Museum	8,319,134	106	The Chronicles of Narnia: The Lion, the Witch and the Wardrobe	8,806,292
7	10,000 B.C.	10,851,097	57	TMNT	4,819,908	107	Garfield: A Tale of Two Kitties	8,228,543
8	Wanted	10,747,059	58	Eragon	4,392,922	108	Eight Below	7,970,307
9	National Treasure: Book of Secrets	9,951,598	59	Ghost Rider	3,759,994	109	Ice Age 2: The Meltdown	5,190,985
10	Journey to the Center of the Earth	9,923,386	60	Live Free or Die Hard	3,979,257	110	Transporter II	4,432,325
11	The Incredible Hulk	8,929,638	61	Shooter	3,245,468	111	Miami Vice	4,267,463
12	The Water Horse: Legend of the Deep	8,752,718	62	Daja Vu	3,800,000	112	The Guardian	3,157,013
13	Flood	6,126,825	63	The Bourne Ultimatum	3,026,471	113	When A Stranger Calls	3,501,508
14	The Golden Compass	4,928,803	64	Doraemon The Movie	2,682,446	114	Firewall	3,231,600
15	D-War	4,370,573	65	Mr. Bean's Holiday	3,048,163	115	World Trade Center	3,227,223
16	Speed Racer	3,184,713	66	Ratatouille	2,871,850	116	X-Men: The Last Stand	3,129,473
17	Vinci	2,891,421	67	Tristan & Isolde	2,569,673	117	Cars	3,129,473
18	Butterfly on a Wheel	2,191,156	68	The Devil Wears Prada	2,401,750	118	The Sentinel	3,063,819
19	Atonement	2,122,170	69	The Host	1,848,333	119	Empire of Wolves	2,399,992
20	Hellboy II: The Golden Army	2,366,875	70	Babel	1,810,727	120	Lasko	2,013,367
<b>Panel B: Domestic Authorized Films</b>								
21	Red Cliff	46,698,967	71	Assembly	34,089,912	121	Curse of the Golden Flowers	42,820,523
22	Painted Skin	33,467,300	72	The Warlords	27,601,246	122	The Banquet	18,251,610
23	A Hope	26,166,803	73	Lust, Caution	17,109,185	123	Fearless	14,823,050
24	The Forbidden Kingdom	26,899,556	74	Lost in Beijing	1,286,914	124	Bo bui gai wak	13,422,447
25	Kung Fu Dunk	15,883,165	75	Protégé	8,069,097	125	Confession of Pain	10,840,085
26	Forever Enthralled	16,652,957	76	Ming Yun Hu Jiao Zhuan Yi	-	126	Battle of Wits	8,972,614
27	Three Kingdoms-Resurrection of the Dragon	9,331,504	77	Invisible Target	4,482,709	127	Dragon Tiger Gate	7,484,473
28	Almost Perfect	6,855,809	78	Secret	4,407,852	128	The Knot	5,252,262
29	Connected	6,427,392	79	Flash Point	4,090,789	129	Tokyo Trial	3,501,508
30	An Empress and The Warriors	6,147,279	80	Blood Brothers	3,944,291	130	Crazy Stone	3,282,664
31	Fit Lover	4,800,559	81	Brothers	3,860,900	131	Ngor fu	1,779,933
32	Desires of the Heart	4,509,616	82	Triangle	3,616,637	132	The Forest Ranger	992,094
33	Storm Rider – Clash of Evils	4,382,825	83	The Secret of the Magic Gourd	2,725,713	133	One Foot Off The Ground	802,429
34	Butterfly Lovers	4,301,830	84	The Sun Also Rises	2,130,247	134	Curiosity Kills the Cat	729,481
35	Missing	3,330,558	85	Big Movie	-	135	Down to love	-
36	The Beast Stalker	2,473,015	86	Getting Home	1,675,150	136	Final Destination 3	721,408
37	Sparrow	2,479,761	87	Twins Mission (Let's steal together)	1,676,554	137	Pirates of the Caribbean: Dead Man's Chest	4,574,736
38	The Deserted Inn	2,260,958	88	Contract Lover	1,860,515	138	Underworld: Evolution	618,690
39	Super Typhoon	2,236,025	89	Ai qing hu jiao zhuan yi	1,547,449	139	Snakes On A Plane	494,571
40	Kung Fu Hip Pop	2,161,941	90	The Matrimony	1,418,495	140	Election 2	1,739,442
<b>Panel C: Unauthorized Films</b>								
41	Transporter 3	-	91	Sex Is Zero 2	-	141	A Millionaire's First Love	-
42	Cape No. 7	978,941	92	Ci Qing	406,003	142	Mr. Wacky	-
43	Resident Evil: Extinction	1,389,420	93	Fantastic Four: Rise of the Silver Surfer	2,414,398	143	The Departed	1,039,728
44	My So-called Love	167,554	94	28 Weeks Later...	564,365	144	Silent Hill	813,228
45	Resident Evil: Degeneration	-	95	The Number 23	15,858	145	My Super Ex-Girlfriend	236,966

46	Saw V	426,329	96	AVPR: Aliens vs Predator - Requiem	1,916,003	146	United 93	406,852
47	Max Payne	-	97	Ocean's Thirteen	1,566,989	147	Scary Movie 4	627,394
48	Twilight	2,213,774	98	Saw IV	455,172	148	The Wicker Man	-
49	Tokyo Boy	-	99	Eden Log	-	149	The Art Of Seduction	291,562
50	Sex and the City: The Movie	2,020,222	100	Beowulf	1,134,834	150	The Covenant	-

Notes:

1. This film list was created before we realize the existence of Box Office Mojo, so ranking of authorized films, which is slightly different from online sample, follows online sources; while the box revenue data were added according to Box Office Mojo afterward to keep the consistency with our online sample. Lists of unauthorized films are created rather randomly. We tried to keep them diversified by including films from different origins, like Taiwan, Korea, France as well as U.S. Their box office revenue data are obtained from Mojo if they were available in Hong Kong. Those without box office revenue data were released in countries, other than Hong Kong (e.g. the 47<sup>th</sup> film 'Max Payne').
2. We attempted to find each year 20 foreign authorized films, 20 domestic films, and 10 unauthorized films. When conducting the survey data (Dec, 2008), available sources limited us to do so. In 2006, we could only find 15 domestic films, and used 16 unauthorized films to make up the list. The 85<sup>th</sup> film 'Big Movie' was actually released in 2006 and the 112<sup>th</sup> film 'The Guardian' in 2007. In summary, 2008: 20 foreign films, 20 domestic, 10 unauthorized; 2007: 21 foreign, 19 domestic, 10 unauthorized; 2006: 19 foreign, 15 domestic and 16 unauthorized.
3. Film 41 and 42 were released in 2009 in mainland China, so at the time when we collected our, they were not yet available to Chinese consumers. We took these two films as unauthorized in student sample, while they are eliminated from online sample. Film 18, 19, 69 and 70 are eliminated from online sample as well because their box office revenue on Mojo is not as high as to make top 20.
4. The 101<sup>st</sup> film 'King Kong' was actually released on Dec, 24<sup>th</sup> of 2005. We took it as a 2006 film.
5. Evidence shows the 76<sup>th</sup> movie 'Ming Yun Hu Jiao Zhuan Yi (a.k.a. Crossed Lines)' was released in mainland China on Nov, 30<sup>th</sup> of 2007, but there is no record on Mojo.