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The Market for Motion Pictures in Thailand: Rank, Revenue, and Survival at the Box Office

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Abstract

We examine the theatrical market for motion pictures in Thailand using a sample of films exhibited in 2004–2008. Using data on weekly and cumulative film revenues, we find strong evidence of increasing returns to information as indicated by substantial concave departures from the Pareto size distribution. The distribution of cumulative revenues across films is consistent with the winner-take-all nature of an elimination tournament. In contrast to other markets dominated by Hollywood imports, several of the top-earning films in Thailand are domestically produced.

Key words: Thai film industry; returns to information; winner-take-all; heavy tails

JEL classification: L82

1. Introduction

This short paper presents a preliminary empirical analysis of the theatrical market for motion pictures in Thailand. The Thai theatrical movie market is particularly interesting due to the competition between domestically produced films and imported foreign films, particularly Hollywood films. (Other film industries—in particular those in India and South Korea—would also appear to be excellent settings in which to study competition between domestic and imported films.) It is well known that US-produced films have become increasingly dominant in the world market with the Hollywood-based motion picture industry overwhelming nearly every other national cinema (Miller et al., 2008, Waterman, 2005). At the same time non-US markets have become increasingly important to Hollywood: The Motion Picture Association of America estimates that in 2007 the North American box-office gross was $9.6 billion and that the international box-office gross was $17.1 billion (Motion Picture Association of America, 2007). We find in our empirical analysis of the Thai movie market that domestically produced films are remarkably competitive with Hollywood films, both in terms of opening-week box-office revenue and in terms of

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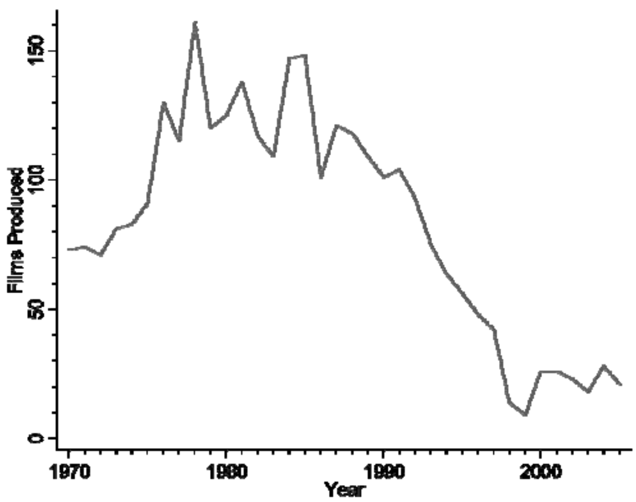
cumulative box-office revenue. This is a relatively new phenomenon in the Thai movie market.

Domestic Thai film production hovered around 60 to 80 films per year during the 1960s. Film production increased throughout the 1970s, peaking immediately after the government raised the import tax for foreign movies in 1977. Figure 1 plots annual Thai film production for the interval 1970–2005. Changes in Thai government policies and in the release strategies of Hollywood film distribution companies, together with the rise of television and alternative forms of entertainment, led to the decline of the Thai movie industry since the 1980s. As empirically documented by Sungsri (2004), the domestic Thai film industry had nearly vanished by the mid-1990s. Thai films had evolved into expensive feature-length productions of popular daytime television dramas which had little entertainment value in comparison with the punchy Hollywood films dominating box-office receipts. However, the re-telling of the classic Thai ghost story *Nang Nak* rekindled interest in Thai film production as a profitable prospect; that film had cost only 7 million Baht to make while its earnings at the box office were about 100 times as much.

Figure 1. Thai Film Production, 1970–2005



Recent studies by Lee (2006, 2008) have examined the box-office performance of Hollywood films in East Asian markets—Hong Kong, Taiwan, South Korea, Japan, Malaysia, Singapore, and Thailand—but these studies have not examined competition within those movie markets. Instead, those studies examined the correlation between Hollywood film revenues in the US and the revenues of the same Hollywood films in individual foreign countries. In contrast, the earlier papers of Walls (1997, 1998) examined competition within the Hong Kong theatrical movie market between domestic Cantonese films and imported Hollywood films. This paper is in the spirit of the earlier papers of Walls (1997, 1998) in that we examine competition within the Thai theatrical movie market and the resulting box-office performance of films.

Aside from our innate interest in studying the Thai film industry, the movie business is an interesting laboratory in which to study all sorts of economic phenomena. Economic research on the motion picture industry includes studies of location choice and spatial competition (Davis, 2006a, 2006b; Chisholm and Norman, 2004), ticket pricing (Cheung, 1980; Rosen and Rosenfield, 1997; Orbach and Einav, 2007), complex auction institutions (Blumenthal, 1988), antitrust analysis and transactions cost economics (Kenney and Klein, 1983; De Vany and Eckert, 1991; Chisholm, 1993; Acheson and Maule, 1994; De Vany and McMillan, 2004), product durability and the timing of releases (Srivastava and Mittal, 1987; Einav, 2007), adapting to technological change (Moul, 2001; Hanssen, 2002), the role of movie stars (Ravid, 1999; De Vany and Walls, 1999), and film finance (Fee, 2002; Rusco and Walls, 2004; Goettler and Leslie, 2005; Palia et al., 2008). One of the most interesting economic issues in the motion picture industry is the extent to which demand is dynamically driven by the transmission of information. When demand is characterized by a recursive dynamic, success is leveraged into further success and the resulting distribution of revenue across films has the winner-take-all property, where revenue is concentrated on a small number of superstar films.

In this paper we test for increasing returns to information and the winner-take-all phenomenon using box-office revenue data from the Thai theatrical movie market for the five-year span 2004–2008. We also quantify the week-to-week performance of films at the box office, including a survival analysis of film lifetimes. The formal empirical evidence reveals strongly increasing returns to information in this market, consistent with earlier findings for theatrical movie markets in the US, the UK, Australia, and Hong Kong. We also find that the cumulative revenue distribution of films is characterized by skewness, heavy tails, and infinite variance.

2. Demand Dynamics and Revenue Outcomes

De Vany and Walls (1996) modeled motion picture demand as a learning process and found empirical evidence of positive information feedback. When information feedback characterizes demand, the success of a film is leveraged into further success while unsuccessful films fail rapidly; this causes the distribution of payoffs across films to have “heavy tails” where the few winners earn a disproportionately large share of the total. De Vany and Lee (2001) investigated the role of information in a simulation model and showed that even with noisy information better movies usually win and that payoffs have the winner-take-all or heavy tails property. Numerous authors—including Walls (1997), Hand (2001), Maddison (2004), and others—have applied the empirical framework from the De Vany and Walls (1996) paper to other samples of data and have confirmed their results of positive information feedback.

Many models have appeared in the economics literature that lead to a highly concentrated distribution of payoffs among competitors, such as Rosen’s (1981) superstar model and Bikhchandani et al.'s (1992) information cascade model. There are several other models of information dynamics where early choosers influence later ones, but they all have in common that the current change in demand can depend on the level of demand revealed previously. When demand has this property, amplifications of initial advantages can lead to a highly uneven distribution of payoffs, a property that well describes popular entertainment and the creative industries (Caves, 2000).

Strong downward concavity of the revenue-rank distribution is an indication of autocorrelated growth in revenues, and this is the observable implication of increasing returns to information that can cause some titles to become "hits" and others to become "bombs" through information feedback (De Vany and Walls, 1996). (The Appendix contains a more detailed explanation of how the Pareto size distribution—and deviations from it—are related to autocorrelated growth.) The hypothesis of increasing returns to information is consistent with Rosen's (1981) superstar phenomenon, where small differences in products can become magnified into enormous differences in final outcomes, and it is also consistent with Bikhchandani et al.'s (1992) informational cascades model as well as the other models of herding, contagion, path dependence, and information sharing. This test for information feedback in demand does not permit distinguishing between the competing explanations of the source of the increasing returns, but it does permit us to test the hypothesis of information feedback.

Another implication of superstar models and demand with information feedback is the winner-take-all nature of payoffs (Frank and Cook, 1996). When most of the revenues are accumulated by a small number of titles, the cumulative distribution of revenue will be highly unequal with a few extreme outliers accounting for the bulk of revenues. In the absence of information feedback, we would not expect revenue equality across film titles because films are heterogeneous products with varying degrees of popular appeal. De Vany and Walls (1999, 2002) propose the Pareto distribution as a model of motion picture revenue outcomes. The Pareto distribution has cumulative distribution function:

$$F(x) = 1 - \left(\frac{x_0}{x}\right)^{\alpha}, \tag{1}$$

where $\alpha > 0$ is a shape parameter to be estimated, $x_0 \in (0, x)$ is a scale parameter, and $x \geq x_0 > 0$ is a random variable. The upper tail of the Pareto distribution becomes heavier as the shape parameter α becomes smaller. The Pareto probability density function is:

$$f(x) = \alpha \frac{x_0^{\alpha}}{x^{\alpha+1}}. \tag{2}$$

The r-th moment about the origin is given by $\alpha x_0^r / (\alpha - r)$, and this, as shown by Kleiber and Kotz (2003), only exists if $r < \alpha$. It follows that the mean of a Pareto distribution is given by $\alpha x_0/(\alpha-1)$ and the variance is given by $\alpha x_0^2/\alpha(\alpha-2)(\alpha-1)^2$. Because the Pareto density is decreasing in x, it follows that the mode is x_0.

The Pareto distribution provides a mathematically tractable model of motion picture revenue outcomes that accounts for asymmetry and heavy tails. The Pareto distribution also accounts for the extreme uncertainty surrounding motion picture success because, when the Pareto exponent α is less than two, the variance does not exist; in other words, the integral that defines the variance does not converge, indicating that the variance is infinitely large.

3. Data Description and Statistical Analysis

The data set contains the name, rank, and cumulative box-office revenue for 806 films exhibited in Thailand over the closed interval 2004–2008. For the year 2008, we also collected weekly box-office revenue data for the 219 films that were exhibited during that year. The film-level data allow us to quantify the distribution of cumulative revenues across films, while the weekly data allow us to quantify the rank, incremental revenue, and survival of films over their theatrical lifetimes. The data were obtained from Box Office Mojo, where all monetary quantities are reported in current US dollars. For transparency, we have chosen not to adjust the data. Though inflation in Thailand varied from about 2% to 5% per annum over the course of our sample period, the statistical estimations in this paper contain variables that control explicitly for week-specific or year-specific effects, so adjusting the revenues for inflation would not impact the empirical results at all since the price index would be perfectly correlated with the set of temporal dummy variables.

Tables 1 and 2 list the top 15 films in terms of opening box-office revenue and cumulative lifetime box-office revenue. In an era when Hollywood films dominate global box-office revenue, it is perhaps surprising that 2 of the top 5 opening films in Thailand are domestic productions. And though these domestic films had very high opening week revenues, the opening revenue accounted for a smaller fraction of the cumulative revenues for these films than for the Hollywood films. The list of top-earning films is also populated by several domestic productions, including the two top-grossing films. Thai films appear to be very successful—in the domestic movie market—in competing with their Hollywood rivals.

Table 3 lists descriptive statistics on the cumulative box-office revenue for all films shown in Thailand, and for films disaggregated by the country of film production. The mean box-office revenue for all films is about 0.53 million USD, with the mean Thai film earning about 0.88 million, the average Japanese film earning about 0.1 million, and the average Hollywood film earning about 0.6 million. For all films—taken as a group or disaggregated by country of production—the median revenue is substantially below the mean; indeed, the revenue distribution is skewed toward the large outlying values. The distribution of revenues also has a higher peak in the center of the distribution relative to a Gaussian distribution as evidenced by kurtosis in excess of 3.

Table 1. Top Opening Films in Thailand, 2004–2008

Rank	Film Title	Opening Revenue	Fraction of Total
1	Harry Potter and the Prisoner of Azkaban	2,448,500	0.62
2	Tamnaan Somdet Phra Naresuan Maharat	2,440,828	0.34
3	Tom yum goong (The Protector)	2,302,800	0.52
4	Harry Potter and the Order of the Phoenix	2,219,992	0.39
5	Harry Potter and the Goblet of Fire	2,096,000	0.45
6	Spider-Man 3	1,993,206	0.33
7	Naresuan (King Naresuan)	1,950,806	0.27
8	The Mummy: Tomb of the Dragon Emperor	1,911,616	0.52
9	Spider-Man 2	1,869,500	0.43
10	Transformers	1,823,172	0.45
11	Pirates of the Caribbean: At World's End	1,790,051	0.40
12	Ong Bak 2	1,557,217	0.53
13	Resident Evil: Extinction	1,507,442	0.53
14	The Bodyguard 2	1,452,345	0.51
15	Teng Nong Khon Ma Ha Hear	1,452,169	0.54

Notes: Films are ranked by opening week revenue in USD.

Table 2. Top Grossing Films in Thailand, 2004–2008

Rank	Film Title	Total Revenue	Year
1	Tamnaan Somdet Phra Naresuan Maharat	7,215,385	2007
2	Naresuan (King Naresuan)	7,124,588	2007
3	Spider-Man 3	6,053,014	2007
4	Harry Potter and the Order of the Phoenix	5,728,373	2007
5	Harry Potter and the Goblet of Fire	4,644,800	2005
6	Pirates of the Caribbean: At World's End	4,463,110	2007
7	Tom yum goong (The Protector)	4,417,800	2005
8	Spider-Man 2	4,351,194	2004
9	Transformers	4,066,435	2007
10	Harry Potter and the Prisoner of Azkaban	3,950,100	2004
11	The Mummy: Tomb of the Dragon Emperor	3,642,139	2008
12	Pirates of the Caribbean: Dead Man's Chest	3,630,000	2006
13	The Holy Man (Luang Pee Teng)	3,500,800	2005
14	Quantum of Solace	3,044,260	2008
15	The Day After Tomorrow	3,009,050	2005

Notes: Films are ranked by cumulative revenue in USD.

Table 3. Descriptive Statistics on Cumulative Box-Office Revenue

	Country of Film Production				
Statistic	**Thailand**	**Japan**	**USA**	**Other**	**All Countries**
mean	880,526	98,256	597,047	459,740	526,459
std dev	856,482	202,252	769,592	664,500	722,828
5th percentile	67,477	3,704	7,835	3,644	3,765
25th percentile	254,469	6,220	51,098	38,670	45,155
median	564,943	22,300	224,180	179,048	190,130
75th percentile	1,111,907	120,501	867,689	571,126	774,741
95th percentile	2,779,893	799,392	2,361,054	2,004,427	2361,054
skewness	1.20	3.03	1.46	2.38	1.84
kurtosis	3.29	11.08	4.00	9.47	5.87

Notes: All monetary quantities are reported in USD.

3.1 Survival at the Box Office

To quantify film survival at the box office, we analyzed the week-to-week performance of the 219 films that were exhibited during the calendar year 2008. During the sample period, a total of 41 titles attained the top ranking, and of these observations the median title remained at the top ranking for a single week. Ranks 2, 3, and 4 were achieved by 49, 48, and 49 titles, respectively, and they remained at these ranks for an average of one week. The completed lifetimes ranged from 1 week to 16 weeks with a median lifetime of just 4 weeks. The films ranged in their initial week from rank 1 to rank 21 and the mean and median ranks at entry were 6.1 and 5, respectively. The range of ranks for the second through fourth weeks that a title remained in movie theaters also spanned the entire range of ranks, with the median and mean ranks falling over a title's lifetime in theatrical exhibition. For the titles that remained on theater screens for five weeks and ten weeks, the highest (numerically lowest) ranks achieved were rank 4 and rank 10 and the median ranks fell to rank 15 and rank 18, respectively. On average, a title's rank and revenues fell until it was replaced in movie theaters by a competing title. However, some individual titles did show noticeable growth in rank and revenue early in their lifetimes before eventually losing revenue and rank and exiting the movie market.

A useful way to systematically analyze the lifetimes of films is to construct a life table such as that displayed in Table 5. About 65% of the films survived more than 4 weeks and fewer than 10% survived 8 weeks or longer. Few titles—about 4%—survived for 10 weeks or longer in theatrical release. The proportion of titles surviving for a given number of weeks in the theatrical market—known as the survivor function—is plotted in Figure 2. The survivor function is convex in the lifetime of a movie, an indication that long lifetimes are a rare event. A related way of quantifying survival is the probability that a title in theatrical exhibition in week t exits the theatrical movie market before week $t+1$; this is known as the hazard rate and we have plotted it in for our sample in Figure 3. The probability of a title dropping out of the movie market rises rapidly until the seventh week, and then it falls as only those rare few films that have substantial staying power remain on theater screens. However, even blockbuster films eventually exit the theatrical movie market due to the confluence of demand saturation and the entry of new competitors.

Table 4. Summary Statistics on Theatrical Exhibition

Variable	Obs	Min	Max	Median	Mean	Std Dev
Weeks at Rank=1	41	1	3	1	1.26	0.54
Weeks at Rank=2	49	1	2	1	1.06	0.24
Weeks at Rank=3	48	1	2	1	1.08	0.28
Weeks at Rank=4	49	1	2	1	1.06	0.24
Weeks at Rank=5	46	1	3	1	1.13	0.40
Weeks at Rank=10	48	1	2	1	1.08	0.28
Weeks Alive	219	1	16	4	4.57	2.32
Rank at Week=1	219	1	21	5	6.09	4.56
Rank at Week=2	211	1	23	7	7.61	4.94
Rank at Week=3	189	1	25	10	10.27	5.28
Rank at Week=4	144	2	26	13	13.00	5.40
Rank at Week=5	94	4	27	15	14.65	5.01
Rank at Week=10	9	10	25	18	17.88	4.98
Rank at Death	219	1	27	17	16.27	4.74

Table 5. Life Table for Films in Theatrical Exhibition

Week Interval		Starting Total	Number of Deaths	Cumulative Survival	Std Err
1	2	219	8	0.9635	0.0127
2	3	211	22	0.8630	0.0232
3	4	189	45	0.6575	0.0321
4	5	144	50	0.4292	0.0334
5	6	94	40	0.2466	0.0291
6	7	54	23	0.1416	0.0236
7	8	31	10	0.0959	0.0199
8	9	21	9	0.0548	0.0154
9	10	12	3	0.0411	0.0134
10	11	9	3	0.0274	0.0110
11	12	6	3	0.0137	0.0079
14	15	3	2	0.0046	0.0046
16	17	1	1	0.0000	—

3.2 Departures from the Pareto Rank-Size Distribution

Before estimating the econometric model, we first plotted the size distribution of our data to have an intuitive sense of how the data correspond to the Pareto rank-size distribution. Figure 4 shows a plot of revenue against rank on logarithmic axes for the 219 films exhibited in the year 2008. The plot would seem to indicate that the data do not conform closely to the log-linearity implied by the strict Pareto law (equation (3) in the Appendix). We shall now test the Pareto rank-size hypothesis formally.

Figure 2. Survivor Function Plot

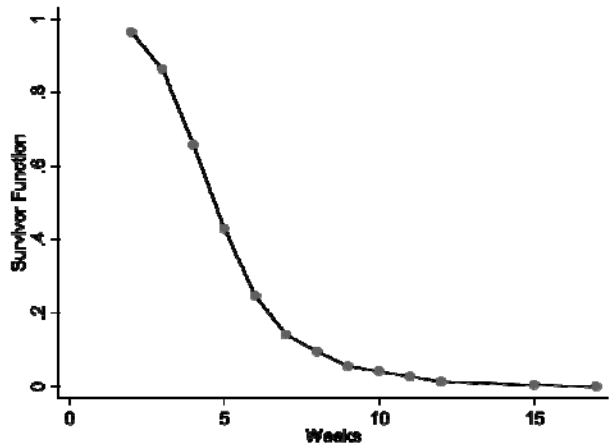
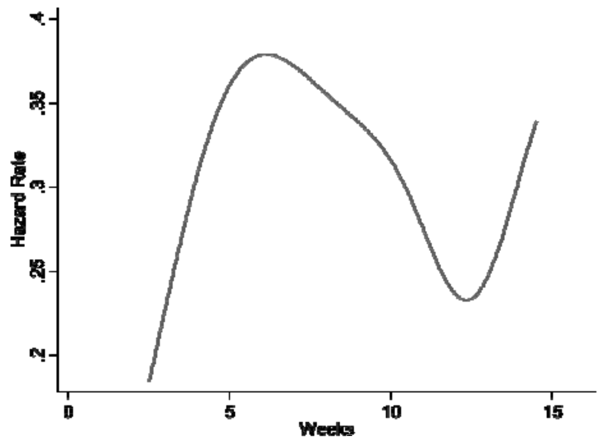
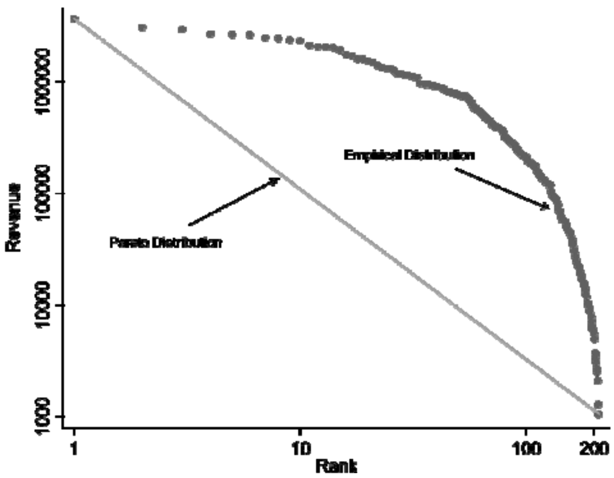


Figure 3. Smoothed Hazard Rate Plot



The Pareto rank-size distribution (equation (3) in the Appendix) was estimated by least-squares regression and the results, including White's (1980) robust standard errors, are reported in Table 6. Column 1 reports the estimates of the Pareto relationship under the assumption of Gibrat's law, and column 2 reports the estimates of the Pareto relationship where autocorrelated growth, the parameter on $(\log Rank)^2$, is to be estimated from the data (equation (4) in the Appendix). It is clear from the table that the parameter on $(\log Rank)^2$ does differ from zero at the 5% significance level; we can reject the null hypothesis of size-independent growth in favor of the alternative of autocorrelated growth. Columns 3 and 4 report the estimates when dummy variables are included in the regression equations to control for possible week-specific shifts in the revenue-rank relationship. The set of weekly dummy variables improved the fit of the regression equation, and the set of weekly dummy variables was jointly significant at the 1% level. The substantive results, however, remained unchanged. The positively autocorrelated growth in weekly revenues means that we reject the null hypothesis of no increasing returns to information.

Figure 4. Revenue-Rank Plot



We also estimated the rank-revenue relationship using cumulative revenues for all 806 films exhibited in the period 2004–2008; these regression results are displayed in Table 7. The results correspond to those reported in the previous table, where column 1 reports the estimates of the Pareto relationship under the assumption of Gibrat's law and column 2 reports the estimates of the Pareto relationship where autocorrelated growth, the parameter on $(\log Rank)^2$, is to be estimated from the data (equation (4) in the Appendix). It is clear from the table that the parameter on $(\log Rank)^2$ differs from zero at the 5% significance level; we reject the null hypothesis of size-independent growth in favor of the alternative of autocorrelated growth. Columns 3 and 4 of the table report the estimates when dummy variables are included in the regression equations to control for possible year-specific shifts in the revenue-rank relationship. The set of annual dummy variables improved the fit of the regression equation only marginally, though the set of annual dummy variables was significant at the 1% level. The substantive results, however, remained unchanged.

Table 6. Estimates of the Weekly Revenue-Rank Relationship (Response is Log Revenue)

	(1)	(2)	(3)	(4)
Constant	14.6459	13.0880	14.9551	13.0904
	(0.0929)	(0.1088)	(0.2534)	(0.0792)
	[0.1016]	[0.0745]	[0.2722]	[0.1614]
Log Rank	−2.7359	−0.1658	−2.7949	0.1019
	(0.0412)	(0.1299)	(0.0388)	(0.1059)
	[0.0463]	[0.1043]	[0.0534]	[0.1290]
(Log *Rank*)^2	—	−0.7577	—	−0.8661
	—	(0.0369)	—	(0.0304)
	—	[0.0322]	—	[0.0357]
Weekly Dummy	No	No	Yes	Yes
Adjusted R^2	0.8147	0.8696	0.8440	0.9157

Notes: Standard errors are in parentheses. Robust standard errors are in brackets. Unit of observation is a film's weekly revenue.

Table 7. Estimates of the Annual Revenue-Rank Relationship (Response is Log Revenue)

	(1)	(2)	(3)	(4)
Constant	18.4936	13.5964	18.4208	13.1629
	(0.1431)	(0.1792)	(0.1567)	(0.1789)
	[0.2429]	[0.3597]	[0.2479]	[0.4088]
Log Rank	−1.5348	1.7633	−1.5400	1.9235
	(0.0337)	(0.1049)	(0.0345)	(0.1008)
	[0.0582]	[0.2054]	[0.0597]	[0.2287]
(Log *Rank*)^2	—	−0.4848	—	−0.5150
	—	(0.0150)	—	(0.0146)
	—	[0.0282]	—	[0.0313]
Yearly Dummy	No	No	Yes	Yes
Adjusted R^2	0.7198	0.8777	0.7209	0.8903

Notes: Standard errors are in parentheses. Robust standard errors are in brackets. Unit of observation is a film's cumulative revenue.

Another interpretation of the regression coefficients in the revenue-rank regressions is the percentage change in revenue resulting from a percentage change in rank. Our finding of concavity in the revenue-rank relationship indicates that changes in revenue and rank are not proportional. This is similar to the payoff structure found in elimination tournaments, where the payoffs decrease more than proportionately as competitors fall from the top ranks.

3.3 The Distribution of Revenues across Films

We now examine the cumulative revenue distribution for films. It is clear from the descriptive statistics presented in Table 3 that the revenue distribution is highly skewed, where the few top-earning films account for the bulk of box-office revenue. It is to be expected that revenues are unequally distributed across titles, and this is seen plainly in Figure 5 in which we plot the cumulative proportion of total revenues accruing to a given percentage of the population of titles—the Lorenz curve—which can be compared to the 45° line, indicating complete equality of revenues across titles. Clearly the observed inequality of revenues across titles is inconsistent with a uniform distribution as indicated by the convexity of the plotted Lorenz curve; the corresponding Gini coefficient is 0.72.

Figure 5. Distribution of Cumulative Revenue over Film Titles

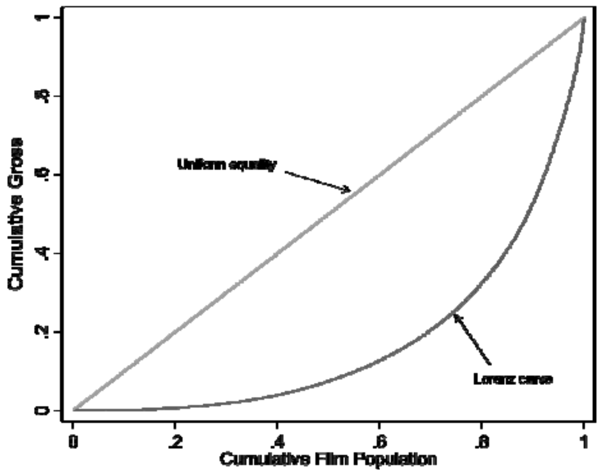


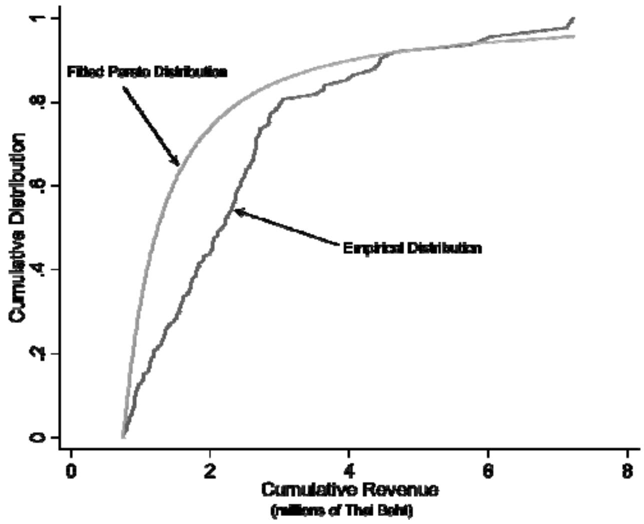
Table 8. Pareto Exponent Estimates

Year	Exponent Estimate	Robust Std Err
2004	1.350	0.163
2005	1.400	0.197
2006	1.495	0.178
2007	1.089	0.109
2008	1.643	0.168
All	1.372	0.071

Notes: The scalar parameter x_0 was set equal to 750,000 in all estimations.

We fit the Pareto distribution by maximum likelihood to the cumulative revenues accruing to films exhibited in Thailand for the years 2004–2008. The estimates of the Pareto exponent α and corresponding standard errors are displayed in Table 8. For each year as well as for all years together, the estimates are in the interval $1 < \hat{\alpha} < 2$, indicating that the variance of movie revenues is infinite, though the mean is finite. These results are consistent with those presented in De Vany and Walls (1999, 2002) using data from the North American movie market, and this is an indication of self-similarity across movie markets of vastly different sizes. The infinite variance of film revenues corresponds well with Caves' (2000) "nobody knows principle," which states that even though we may know a lot about the historical distribution of film returns, this does not permit us to forecast accurately the success of the next film; forecasts can have no precision because the variance of film revenue is infinite!

Figure 6. Fitted Pareto Distribution of Cumulative Film Revenue



4. Concluding Remarks

We have presented an empirical analysis of the theatrical market for motion pictures in Thailand. This market is characterized by competition between domestic Thai films and foreign films. We find evidence of strongly increasing returns to information in this market, consistent with earlier findings for theatrical exhibition in the US, the UK, Australia, and Hong Kong. We also find that the distribution of cumulative revenues across films is consistent with the winner-take-all nature of an elimination tournament. In contrast to other theatrical movie markets dominated by Hollywood imports, several of the biggest box-office hits in Thailand are domestic productions.

While this paper has presented a thorough analysis of the theatrical market for films in Thailand, it raises a number of issues that future research should seek to address in the analysis of film markets characterized by competition between a small domestic industry's production and globally dominant imported films. It is well-known that theatrical revenues worldwide are becoming a smaller component of overall film revenues due to the growing importance of home video and other ancillary revenue streams. Accounting for these other revenue streams—something we cannot do now due to lack of pertinent data—may be important in enhancing our overall understanding of the movie market. Another potentially important and related issue is the relative importance of domestic market success for domestic films in comparison to foreign films. Domestically produced films may have no alternative markets where they can earn revenue and this may affect the selection of films that are actually produced. The domestic market may represent a tiny fraction of overall revenues for foreign films, with no perceptible impact on the decisions made regarding which films are made or how they are distributed. It is hoped that this paper will help to stimulate the research efforts of other applied microeconomists.

Appendix

In studying the size distribution of firms, Steindl (1965) discovered that the size of a firm S is systematically related to its rank R in an industry according to the Pareto law $S \times R^{\beta} = A$, where β and A are constants. In the Thai movie market titles are naturally ranked by their revenues, so the Pareto law implies the following log-linear relationship between revenue and rank:

$$\log Revenue = \log A - \beta \log Rank \,. \tag{3}$$

The Pareto law shown above can be derived analytically assuming that the growth rate of revenues is independent of size, and that there is a constant rate of entry for new titles (Simon, 1955). Empirical size distributions can deviate from the Pareto law in (3), and Ijiri and Simon (1974) find that empirical size distributions are often characterized by concavity rather than having the log-linearity implied by the Pareto law. In the movie market we can interpret deviations from the Pareto law in the following way: an increase in revenues can affect future growth through either (a) information sharing between those individuals who viewed the film and potential viewers or (b) herd- or contagion-like behavior on the part of potential viewers. Regardless of the behavioral cause of the information feedback onto demand, the effect of the demand increase will ultimately diminish over time due to the saturation of the potential audience and the entry of new competing titles. When growth rates can be autocorrelated, Ijiri and Simon (1974) find that positive autocorrelation leads to a downward concavity in the size distribution, and they suggest quantifying the curvature of the relationship by adding a quadratic term in rank to capture the nonlinearity:

$$\log Revenue = \log A - \beta \log Rank + \gamma (\log Rank)^2 \,. \tag{4}$$

A non-zero value of the parameter γ indicates a deviation from the Pareto law, with the curvature of the distribution being concave downward if $\gamma < 0$ and convex downward if $\gamma > 0$.

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