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Revenues, Profitability, and Returns: Clinical Analysis of the Market for Mobster Films

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Abstract

We analyze empirically the revenues, profitability, and financial returns of mobster-related movies using data from worldwide theatrical exhibition, television syndication, and video rentals and sales. We quantify the revenues across each window of exhibition in relation to subsequent windows and to the production budget. A regression model is used to show the composition of worldwide revenues in relation to production value across the sequential windows of release. Project-level profitability and returns to investment are found to deviate substantially from normality. For the purpose of investment decision-making and risk management, the distribution of financial returns is fitted using the Lévy-stable distribution to account for its high peak and heavy upper tail. Gangster-film profitability prospects are computed from the fitted Lévy-stable distribution.

Key words: movie industry; gangster films; Lévy-stable distribution

JEL classification: L820; Z110; C160

1. Introduction

The business of motion pictures is a fascinating laboratory for applied researchers in economics and commerce. Due to the glamorous subject matter the industry is inherently interesting to even casual observers, but more important to scholars is the availability of project-level data on investment and financial returns. Most studies of investment decisions are conducted at the industry or firm level, so that the researcher only observes aggregated returns on a portfolio of projects. In the movie business, the unit of observation is the individual project—the one-of-a-kind film that is to be produced, distributed, and exhibited through the many mediums available in today's global entertainment marketplace.

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The motion-picture market is global. The decision to produce a motion picture must account for the revenues to be earned not only through theatrical exhibition in the home country but also on the revenues that will accrue from international theatrical exhibition, television syndication, and sales and rentals on video and DVD, in addition to any other revenues that may result from licensing fees or other sources. The industry knows that post-theatrical revenues are crucial to the financial success of a motion-picture project, yet virtually all studies of motion-picture markets consider only domestic (United States and Canada) theatrical revenues.

In this paper we examine the worldwide revenues, profits, and financial returns of the film industry. We focus our analysis on a particular segment of the film industry—the market for mobster-related films. This segment of the international film business is interesting in and of itself. However, the analysis of the paper is fully general and applicable to any particular segment of the film industry. Making the analysis specific to a particular type of film demonstrates how a practitioner would apply the tools and techniques. A practitioner—a venture capitalist for example—would be concerned with the prospective return on investment for a particular project conditional on its attributes and not on the unconditional distribution of returns.

The market for mobster-related films is truly international because the crime-driven action-adventure storyline can transcend the barriers of language and culture. Since the first crime-driven film—D.W. Griffith's 1912 silent motion picture *The Musketeers of Pig Alley*—criminal activity as a distinct film genre has continued to be developed by filmmakers the world over. The stories in these films reflect factors external to the world of literature and theater. These films highlight the collision of the "overworld" and the "underworld" in everyday life. The storyline for many crime-related films bears a remarkable resemblance to reality, often being similar to stories that have appeared on the pages of respectable periodicals. The durability of this particular genre for film lies in its being a flexible and adaptable metaphor for social relations (Hardy, 1996). Gangster films also display a story punctuated with episodes of high intensity. "It is this energy and social climbing (both features of displaced sexuality) that make the early gangster an optimistic figure and at the same time a tragic one, doomed because his energy can never be enough" (Hardy, 1996, p. 306).

The paper continues with a description of our sample of data on mobster-related films and a discussion of the financial performance of these films. In Section 3 we quantify the revenues, profitability, and returns to investment for our sample of films. The prospects for financial returns are modeled in Section 4 using the Lévy-stable distribution to account for the skewness and heavy tails in the data. Section 5 distills the important conclusions from this research.

2. Data Description and Sample Statistics

The empirical analysis below uses data on worldwide revenue from theatrical exhibition, television syndication, and video sales and rentals of mobster-related films—films with the Italian mafia, African-American crips and bloods, Mexican mafia, Japanese yakuza, Aryan brotherhood, Chinese triad societies, or any other gangster-related entity as an integral element in the film's plot. In addition to worldwide revenues, the data set also contains the estimated production budget, which is used to calculate the producer's profit and return on investment. The data were compiled and cross-validated by The Numbers (www.the-numbers.com), a company specializing in the collection and compilation of motion-picture industry data. The primary sources of domestic and foreign box-office grosses were Nielsen/EDI and Exhibitor Relations, or the figures were derived from individual country charts for each of the major markets of Europe, Asia, and Latin America. DVD and video sales and rentals were obtained from the reports of VideoScan, VidTrac, and Video Store Magazine. Total worldwide sales of all TV rights are also included in the data set. This information is either collected from Variety or estimated based on standard industry practices (Variety, 2003; Variety, 2004). These data include each film's estimated profit (or loss) in proportion to the film's production budget for films that are mob-related. The estimated returns to the producer are inclusive of worldwide box-office receipts and DVD and video sales and rentals.

The titles, distributors, and dates of release of the forty-four mob-related films comprising the sample are listed chronologically in Table 1; it should be noted that the title, distributor, and dates in Table 1 pertain to the initial domestic theatrical release which, for each movie, was in America and Canada. (In terms of relative size, Canada can be thought of as an additional state of the US.) The films were released between the years of 1994 and 2000, inclusive, and include films distributed by small independent companies (e.g., Vista, Eros, and Phaedra) as well as the well-established majors (e.g., Warner Bros., Sony, and MGM /UA). Although the sample of films is limited to releases in 1994–2000, the revenue data include all worldwide revenues earned through June 2004; this time frame accounts for the bulk of post-theatrical revenues (Rusco and Walls, 2004).

Table 1. Composition of Sample

Release Date	Movie Title	Distributor
04-Feb-1994	Romeo Is Bleeding	Gramercy
25-Feb-1994	Sugar Hill	20th Century Fox
20-Jul-1994	Client, The	Warner Bros.
26-Aug-1994	Police Academy 7: Mission to Moscow	Warner Bros.
07-Oct-1994	Specialist, The	Warner Bros.
18-Nov-1994	Professional, The	Sony
03-Feb-1995	Jerky Boys, The	Buena Vista
21-Apr-1995	Kiss of Death	20th Century Fox
27-Oct-1995	Leaving Las Vegas	MGM/UA
22-Nov-1995	Casino	Universal
22-Nov-1995	Money Train	Sony
01-Dec-1995	Things to Do in Denver when You're Dead	Miramax
02-Feb-1996	Juror, The	Sony
16-Feb-1996	City Hall	Sony

05-Apr-1996	Faithful	New Line
21-Jun-1996	Eraser	Warner Bros.
19-Jul-1996	Fled	MGM/UA
16-Aug-1996	Kansas City	Fine Line
04-Oct-1996	Bound	Gramercy
01-Nov-1996	Funeral, The	October
28-Feb-1997	Donnie Brasco	Sony
18-Apr-1997	8 Heads in a Duffel Bag	Orion
15-Aug-1997	Cop Land	Miramax
14-Nov-1997	Jackal, The	Universal
20-Mar-1998	Mr. Nice Guy	New Line
24-Jul-1998	Jane Austen's Mafia	Buena Vista
11-Sep-1998	Rounders	Miramax
20-Nov-1998	Enemy of the State	Buena Vista
25-Dec-1998	Swindle, The	New Yorker
22-Jan-1999	Gloria	Sony
05-Mar-1999	Lock, Stock and Two Smoking Barrels	Gramercy
05-Mar-1999	Analyze This	Warner Bros.
12-Mar-1999	Corruptor, The	New Line
04-Aug-1999	Gambler, The	Legacy
20-Aug-1999	Mickey Blue Eyes	Warner Bros.
17-Sep-1999	Taxman	Phaedra
21-Jan-2000	Boondock Saints, The	Indican
04-Feb-2000	Gun Shy Buena	Vista
18-Feb-2000	Whole Nine Yards, The	Warner Bros.
03-Mar-2000	Ghost Dog: Way of the Samurai	Artisan
26-May-2000	Hum to Mohabbt Karega	Eros
25-Aug-2000	Art of War, The	Warner Bros.
20-Oct-2000	Yards,The	Miramax
08-Dec-2000	Snatch	Sony

The films range from those featuring known Hollywood stars such as Robert De Niro in the mafia comedy *Analyze This* to films that feature Hollywood newcomers such as Hong Kong superstar Chow Yun Fat in the New York-style Chinese triad action film *The Corruptor*. Although some films in the sample have low budgets—less than USD 5 million—all of the films in the sample enjoyed a theatrical release and were also released on video and DVD. The sample reflects movies across a wide range of budgets, producers, and directors.

Table 2 provides summary statistics for the sample of films (all monetary figures are reported in US dollars). The table sets out the mean and median, standard deviation, minimum, and maximum values for each film's production budget and revenue from domestic (US and Canada) theatrical exhibition, international theatrical exhibition, television, and video/DVD sales and rentals and the statistics of theatrical play including the survival time on theater screens and the number of screens for each film at the point of widest release. We now discuss the summary statistics in the order of tabulation. Production budgets for the films ranged from a low of 1.35 million for the black comedy *Lock, Stock and Two Smoking Barrels* to a high of 100 million for the action/adventure film *Eraser*, with a mean of 23.9 million and a median of 14 million. The substantial variation in budgets shows that the production of mob-related films appeal to eclectic auteurs as well as to Hollywood executives of the blockbuster mentality.

Table 2. Summary Statistics on Budget, Revenues, and Theatrical Play

Variable	Obs	Mean	Std Dev	Min	Median	Max
Budget	44	2.39e+07	2.31e+07	1350000	1.40e+07	1.00e+08
US Box Office	44	2.49e+07	3.03e+07	9871	1.62e+07	1.12e+08
Foreign Box Office	44	2.15e+07	3.54e+07	0	3965342	1.39e+08
Worldwide TV	44	6982955	1.01e+07	0	2500000	4.00e+07
Video/DVD Sales	44	1.29e+07	1.55e+07	5000	7500000	6.00e+07
Video/DVD Rentals	44	2.40e+07	2.92e+07	10000	1.53e+07	1.11e+08
Int'l Video/DVD	44	4.44e+07	7.42e+07	0	8000000	3.15e+08
Weeks in Cinema	44	11.47	6.63	1	12	33
Widest Screens	44	1245.47	982.43	1	1527	2910

Domestic theatrical revenues had a mean of 24.9 million and a median of 16.2 million. The action/adventure film *Enemy of the State* featuring actor Will Smith was the highest grossing film at 112 million, and the action/adventure film *Taxman* was the lowest grossing film at 9,871 dollars. International theatrical revenues were lower on average than domestic revenues, with a mean of 21.5 million, but had higher variation with a standard deviation of 35.4 million as compared to a standard deviation of 30.3 million for domestic theatrical revenue. The largest and smallest grossing films in the international market correspond identically to the domestic theatrical market. As is often the case, success in the domestic theatrical market translates into success in foreign markets; this can result from momentum effects in audience dynamics as well as from the terms of the distribution contract (De Vany and Walls, 2004a; Daniels et al., 1998).

Television sales and revenue from video/DVD sales and rentals complete the worldwide sources of revenue. Television sales varied from none to a maximum of 40 million for *Enemy of the State*, with a mean of about 10 million. Domestic Video/DVD rentals were also highest for that movie, but domestic video/DVD sales were slightly higher for the Robert De Niro comedy *Analyze This* at 60 million. International video/DVD sales and rentals averaged 74.2 million with the highest earning movie being action/adventure blockbuster film *Eraser* featuring Hollywood stars Arnold Schwarzenegger, James Caan, Vanessa Williams, and James Coburn. Star power, dramatic effects, and extreme violence may together explain the somewhat greater success of certain films in the international markets since these production values translate well into any language or culture (De Vany and Walls, 1999; De Vany and Walls, 2002; Ravid, 1999; Basuroy and Ravid, 2004).

The number of screens at the point of widest release—a measure of how widely the motion picture was able to open—varies from a single screen for *The Gambler* to nearly three thousand screens for *The Whole Nine Yards*. The duration of play in the domestic theatrical market varied from a short lifetime of a single week for two movies, *Taxman* and *The Gambler*, to a movie with "legs" including a lifetime of thirty-three weeks for *Leaving Las Vegas*.

3. Quantifying Global Movie Revenues, Profit, and Returns

From the data description above we can sense that strong performance in the domestic theatrical market may translate into strong performance in the international theatrical market and in the television and video/DVD markets. To make such a comparison concrete we calculate the Pearson correlation coefficients between the production budget and each source of revenue in Table 3.

Table 3. Pearson Correlations of Budget and Sources of Revenue

		Box Office			Video/DVD		
	Budget	Domestic	Foreign	TV	Sales	Rentals	Int'l
Budget	1.0000						
US Box Office	0.7427	1.0000					
Foreign Box Office	0.7736	0.8232	1.0000				
Worldwide TV	0.8000	0.9278	0.9565	1.0000			
Video/DVD Sales	0.7032	0.9787	0.7866	0.9105	1.0000		
Video/DVD Rentals	0.7486	0.9976	0.8235	0.9289	0.9840	1.0000	
Int'l Video/DVD	0.7899	0.8013	0.9937	0.9475	0.7636	0.8033	1.0000

Note: All Pearson correlations reported above are statistically different from zero at the 1% marginal significance level.

The correlation matrix shows that revenues in each window of a film's release are highly correlated with the production budget, with the correlations ranging from 0.70 to 0.80. The matrix also shows the correlations between successive windows of exhibition. Domestic theatrical revenues are very highly correlated with revenues from global television and domestic video/DVD sales and rentals and less highly correlated with foreign theatrical and video/DVD revenues. It is interesting to note that the lowest correlations in the table are between domestic and international theatrical revenues and between domestic and international video/DVD sales and rentals, showing that the rest of the world does not mimic the choices of the domestic (US and Canada) market.

The correlation analysis highlights the relationship between production budget and the sources of revenue, but it masks the way in which the production budget relates to revenue in each individual window of exhibition. A direct way to show how the production budget relates to window-specific revenue is to estimate regression equations of the form

$$\text{Revenue}_{ij} = \alpha + \beta_j \text{Budget}_i + \mu_i \,, \qquad (1)$$

where i indexes individual films, j indexes the window of exhibition (domestic theatrical, television, etc.), and μ is a stochastic disturbance. Because least-squares regression is a linear projection, the individual coefficient estimates β_j sum to the same value that is obtained when estimating the slope β in the regression equation

$$\sum_j \text{Revenue}_{ij} = \alpha + \beta\ \text{Budget}_i + \mu_i\ . \tag{2}$$

In other words, $\hat{\beta} = \sum_j \hat{\beta}_j$. Because of this mathematical fact, the estimated regression coefficients quantify the composition of total global revenue for a movie that can be attributed to each window of exhibition in relation to the production budget.

The regressions are displayed in Table 4 for revenues earned in each window of exhibition and for the sum of all global revenues. Across all regressions in the table, the constant term does not differ statistically from zero and this is consistent with our expectation that revenues should vary in proportion to production value.

Table 4. Relation of Budget to Window-Specific Revenue

	Independent Variable				
	Constant		Budget		
Dependent Variable	coeff	std err	coeff	std err	R^2
US Box Office	1547152	4481844	0.97579	0.13576	0.5516
Foreign Box Office	−6892698	4959860	1.18854	0.15024	0.5984
Worldwide TV	−1346381	1332593	0.34876	0.04037	0.6399
Video/DVD Sales	1626501	2437254	0.47316	0.07383	0.4944
Video/DVD Rentals	1371495	4276161	0.94778	0.12953	0.5604
Int'l Video/DVD	−1.63e+07	1.01e+07	2.54171	0.30444	0.6240
Total Revenue	−1.85e+07	2.81e+07	7.45152	0.85139	0.6459

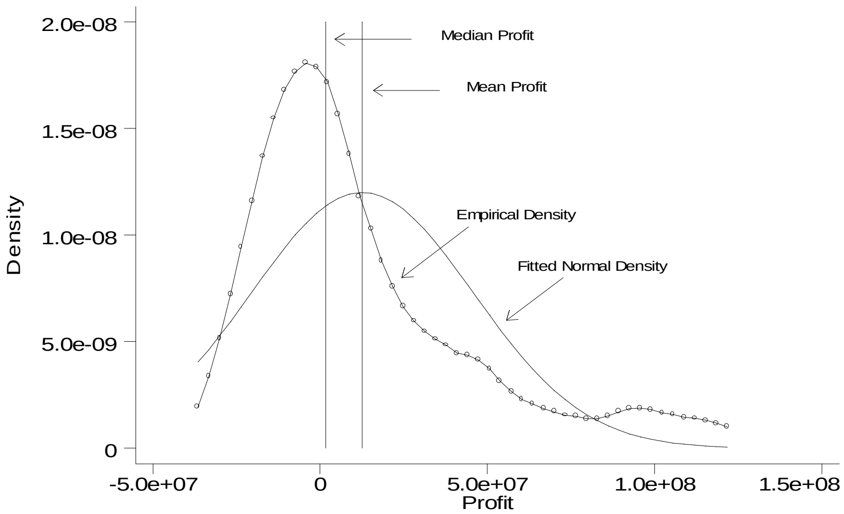
The coefficient on budget in each regression is positive and significantly different from zero at the 1% marginal significance level, again consistent with our expectations. The point estimates indicate that an additional dollar of production value results in a worldwide increase in revenue of about 7.45 dollars; the composition of this 7.45 dollars across exhibition windows can be determined by examining the coefficient estimate on budget for each of the windows. Domestic and foreign theatrical revenues contribute 0.97 and 1.19 dollars to global revenue, respectively, while television contributes 0.35 dollars. Domestic video/DVD sales and rentals contribute 0.47 and 0.95 dollars, respectively, while international video/DVD sales and rentals contribute 2.54 dollars for each additional dollar of production budget.

The revenue regressions were also re-estimated using a Huber (1964) bounded influence estimator that is robust to outlying observations. It is important to determine the fragility or robustness of our results because the average of the movie revenues are dominated by the very large outlying observations and failure to account for this can lead to misleading statistical results (Walls, 2004). Our robust regression analysis resulted in parameter estimates and standard errors that were nearly the same as those obtained from the least-squares regression analysis discussed above. Thus, our statistical results appear to be robust and not fragile.

It is important to quantify revenues because once the production budget is fixed the flow of revenues will determine a film's profitability. Among the movies in our sample, the producer's profit varied from a low of losing 25.8 million for *Gloria* to a high of earning 110 million for *Analyze This*, with a mean of 1.6 million and a median of 12.6 million. Because we are ultimately concerned with making probability statements and statistical inferences on profitability and return on investment, we plot in Figure 1 the empirical density of profits overlaid with a fitted normal distribution; the empirical density function was estimated using the Epanechnikov kernel and the statistical calculations were performed using Stata for Linux (Stata Corporation, 2001). From the figure it is clear that movie profits deviate substantially from normality due to a high peak in the center of the distribution and a heavy upper tail. These empirical findings confirm the earlier findings of De Vany and Walls (2004).

We also analyze the return to investment across the forty-four mobster movies because this metric of analysis standardizes the profits to be free from monetary units. Examination of the distribution of returns, shown in Figure 2, reveals the characteristic sharp peak and heavy upper tail found in earlier statistical research on movie returns (De Vany and Walls, 2004b). The mean return is about 0.822 and this far exceeds the median return of 0.165. In fact, 24 films had positive returns and 20 films had negative returns. Unconditionally, the probability of a positive return is greater than a fair coin landing "heads" up. This outlook for a positive return is much better than for all movies exhibited in North America: De Vany and Walls (2004b) find in their analysis of over 2,000 movies exhibited between 1984 and 1996 that 22% earned a profit and the remaining 78% were unprofitable; Vogel (1990) reports that about 80% of all movies are unprofitable.

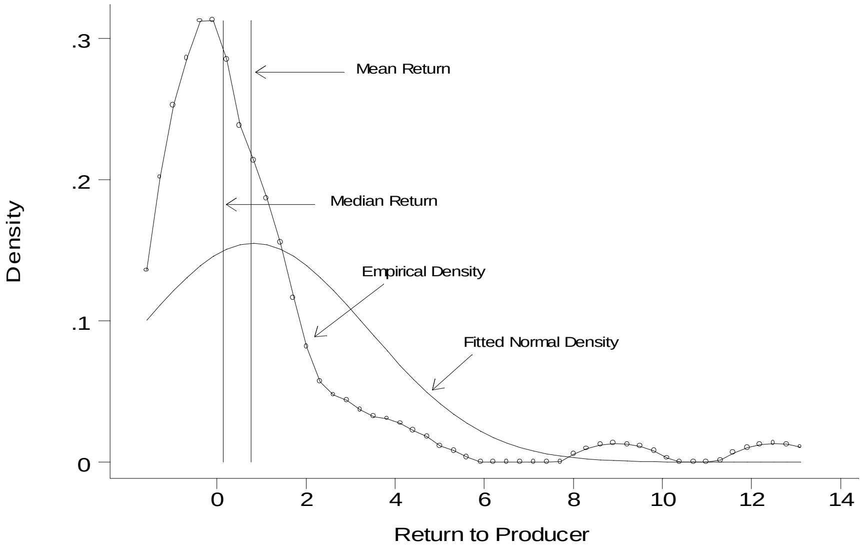
Figure 1. Empirical and Normal Density Estimate of Producer's Profit



Note: The empirical density function plotted above was estimated using the Epanechnikov kernel.

Making probability statements about the returns of a prospective movie project is difficult because movie returns are not normally distributed. This can be understood visually by comparing the fitted normal distribution of financial returns to the empirical distribution in Figure 2.

Figure 2. Empirical and Normal Density Estimate of Producer's Return



Note: The empirical density function plotted above was estimated using the Epanechnikov kernel.

The standard way of assessing probabilities in finance would be to assume that returns follow a normal (or lognormal) distribution, estimate the sufficient statistics of the distribution, and then make probability statements using tabulated percentiles of the distribution. But movie returns are not normal and they are not lognormal: the skewness-kurtosis test results in a value of 35.5, far larger than the $\chi^2(2)$ critical value, and we can also reject the hypothesis of lognormality.

Because movie returns are not normally (or lognormally) distributed, using the normal (or lognormal) distribution to make probability statements is incorrect and would result in misleading inferences. What is required is a model that can account for the possible range of values, asymmetries, and tails that are heavier than exponential. The following section applies a statistical model to film returns that explicitly satisfies all of these requirements.

4. Lévy-Stable Modeling of Movie Returns

Following the recent work of De Vany and Walls (2004b), we use a general Lévy-stable distribution as the statistical model for quantifying motion-picture returns. The Lévy-stable distribution has been used as a statistical model in the physical and the social sciences for over four decades (Mandelbrot, 1963; Fama, 1965; McCulloch, 1996; Adler et al., 1998). The Lévy-stable distribution is general in character because it results from the generalized central limit theorem which states that the only nontrivial limit of sums of independent and identically distributed terms is stable (Zolotarev, 1986; Samorodnitsky and Taqqu, 1994). This distribution is descriptive of many observed processes in economics and finance where the observed quantities result from the summation of many small terms and the same quantities show heavy tails and significant skewness that are too extreme to have been generated by a normal distribution.

The most convenient and most common parameterization of the stable distribution is $X \sim S(\alpha, \beta, \sigma, \mu)$ where the characteristic function of X is given by

$$E\left[\exp\left(itX\right)\right] = \begin{cases} \exp\left\{-\sigma^{\alpha}\left|t\right|^{\alpha}\left[1 - i\beta\left(\tan\frac{\pi\alpha}{2}\left(\text{sign } t\right)\right)\right] + i\mu t\right\} & if \quad \alpha \neq 1 \\ \exp\left\{-\sigma\left|t\right|\left[1 + i\beta\frac{2}{\pi}\left(\text{sign } t\right)\right] + i\mu t\right\} & if \quad \alpha = 1 \end{cases} \tag{3}$$

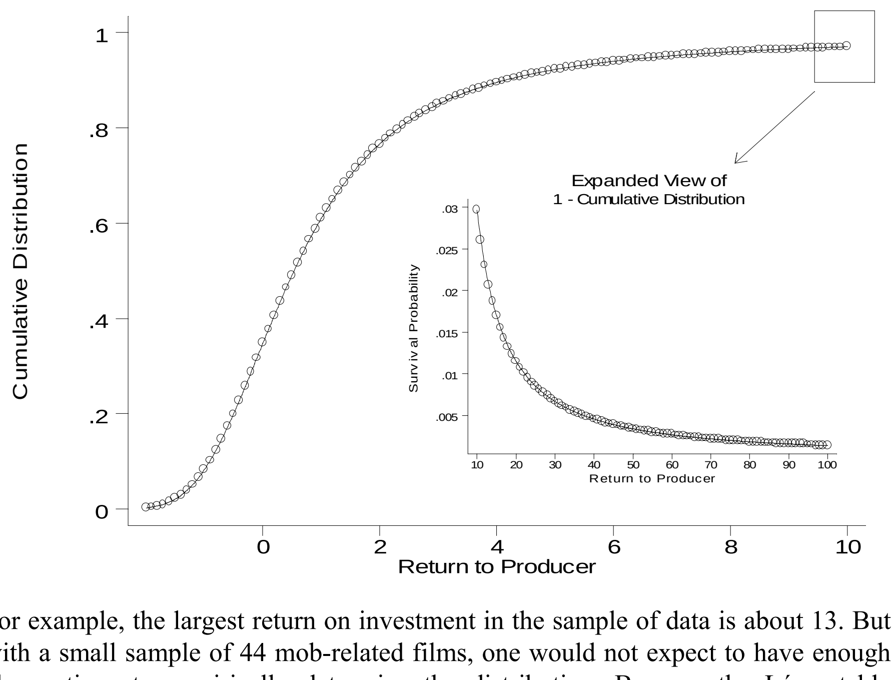
In this parameterization, due to Zolotarev (1986), each parameter has an intuitive interpretation. The characteristic exponent α is a parameter of particular interest because the variance of the stable distribution is infinite when $\alpha < 2$. The skewness coefficient β has a range of $-1 \leq \beta \leq 1$, where 0 indicates symmetry and the magnitude of negative or positive values indicates skewness toward the lower or upper tail, respectively. The scale parameter σ must be positive and it expands or contracts the distribution about the location parameter μ. The stable distribution function nests several well-known distributions including the normal (Gaussian) when $\alpha = 2$, the Cauchy when $\alpha = 1$ and $\beta = 0$, and the Lévy when $\alpha = 0.5$ and $\beta = \pm 1$. As the characteristic exponent α approaches 2, the skewness coefficient β has less impact on the shape of the distribution; when $\alpha = 2$ the distribution has only two parameters, location and scale, and they correspond to the familiar mean and variance of the normal distribution. In practice it may be important to estimate all four parameters of the general stable distribution rather than assuming that $\alpha = 2$: the normal mean-variance model of risk analysis is not valid when $\alpha < 2$ because the variance of outcomes is infinite.

The importance of the stable distribution in economics and finance has been recognized for some time, but only recently have advances in statistical computation allowed parameter estimation and calculation of the corresponding distribution function. The parameters of the stable distribution can be estimated using McCulloch's (1986) quantile estimator. As the name suggests, this estimator fits the distribution by matching the theoretical quantiles to the empirical quantiles. In our application, we feel that this estimator is preferable to the Pareto tail-index estimators because the tail index estimators fit the distribution using only a small portion of the data and the quantile estimator fits the distribution using the portion of the data having the bulk of the probability mass; this is important in practice because even with a large sample there will be few realizations that are in the upper tail; indeed, this is precisely why the empirical density function is of little use in making investment decisions when returns are driven by extreme observations.

The parameters are estimated using the quantile method of McCulloch (1986). The point estimate of the parameter vector $(\alpha, \beta, \sigma, \mu)$ is (1.27, 1, 0.92, 0.16). A number of points are notable about the estimates. First, the characteristic exponent α has a value less than 2, indicating that the variance of the distribution of returns is infinite. This finding is consistent with the results reported by De Vany and Walls (1999, 2002, 2004), who find using a variety of statistical tools that the variance of movie performance is infinite. Notable also is that the estimate of α is greater than unity, indicating that the mean of the distribution of returns does in fact exist. Second, the distribution is positively skewed. Because the skewness is greater than zero, the estimated Lévy-stable distribution is inconsistent with a normal distribution. The large positive skewness is typical of outcomes in the entertainment industry where we observe a superstar or winner-take-all property (Rosen, 1981; Frank and Cook, 1996).

The fitted Lévy-stable distribution function corresponding to our point estimates is plotted in Figure 3. In the figure is an insert that plots an expanded view of the probability mass contained in the upper portion of the distribution. What can be gleaned from the estimated distribution that could not be learned by simple examination of the nonparametric density function estimate shown in Figure 2 above? The answer is that more accurate probability statements can be made.

Figure 3. Lévy-Stable Distribution Function Estimate



For example, the largest return on investment in the sample of data is about 13. But with a small sample of 44 mob-related films, one would not expect to have enough observations to empirically determine the distribution. Because the Lévy-stable distribution explicitly accounts for skewness and heavy tails, it permits us to make inferences about events that are outside the sample. For example, what is the probability that a film earns a return on investment of 20 times or higher? From the sample of data, one cannot answer this question. But from the Lévy-stable estimates, one can compute exactly the probability mass in the upper tail as displayed in Table 5.

Table 5. Probability Estimates from the Upper Tail of Returns

x	Prob(Return > x)
5	0.077628
6	0.060415
7	0.048769
8	0.040489
9	0.034365
10	0.029685
11	0.026014
12	0.023069
13	0.020664
14	0.018667
15	0.016986
16	0.015556
17	0.014325
18	0.013257
19	0.012322
20	0.011498
21	0.010767
22	0.010114
23	0.009529
24	0.009001
25	0.008523
26	0.008088
27	0.007691
28	0.007328
29	0.006994
30	0.006686
31	0.006402
32	0.006138
33	0.005893
34	0.005665
35	0.005452
36	0.005253
37	0.005067

The probability that a film earns a return of 13 or more is about 0.02—and this corresponds roughly to the sample statistic that one film out of 44 had a return this large. But we can also make probability statements about events not observed in the sample. What is the probability that a film earns a return of 27 or higher? The computed probability is 0.007691, or about three-fourths of one percent.

5. Conclusion

The market for motion pictures is global and the revenues from all sources are important in making investment decisions. This research is the first study to systematically examine and quantify film earnings from all sources including domestic and international box-office revenues, television syndication fees, and the sales and rentals of film on video and DVD.

Our empirical analysis shows precisely how the increased revenue associated with greater production value is generated in each window of a film's release. Our analysis also demonstrates that film returns—characterized by skewness and heavy tails—can be modeled using the Lévy-stable distribution for the purpose of making the probability statements essential to investment decisions.

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