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Movie Advertising and the Stock Market Valuation of Studios: A Case of "Great Expectations?"

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Product innovation is the key revenue driver in the motion picture industry. Because major studios typically launch fewer than 20 movies per year, the financial performance of a single release can have a major effect on the studio's profitability. In this paper we study how single movie releases impact the investor valuation of the studio. We analyze the change in postlaunch stock price and predict the direction and magnitude of excess returns based on the revenue expectation built up for a movie release. That expectation is set, in part, by media support; i.e., highly advertised movies are expected to draw larger audiences than others. By using an event-study methodology, we isolate the impact of a movie launch on studio stock price and track the determinants of that change.

We examine a comprehensive data set comprising over 300 movies released by the largest studios. Our results indicate a clear *interaction* between the marketing support received by a movie and the direction and magnitude of its excess stock return post launch. Movies with above average prelaunch advertising have lower postlaunch stock returns than films with below average advertising. Our findings also suggest that movies that are hits at the box office may result in a lowering of stock price if they had high media support because of high performance expectations built up prior to launch. Thus prelaunch advertising plays a dual role of informing consumers about a movie's arrival as well as helping investors form expectations about the studio's profit performance.

Key words: advertising; stock market valuation; marketing-finance interface; stock return modeling; motion pictures
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Introduction

The motion picture business is among the highest-profile industries in the world. In the United States alone, box office receipts crossed $9.4 billion in 2006, making it one of the most successful years in its 100-year history. The industry has grown steadily over the past few decades in terms of attendance growth as well as product investment. According to the Motion Picture Association of America (MPAA), the average marketing cost of a new feature film was $34.5 million for the year 2006.

Given that most studios release between 10 and 22 movies in a typical year (Table 1), and that only a handful of these turn out to be profitable, a single movie can have a large impact on the annual profit of the studio. Indeed, in this industry there are weekly new product launches, and the product life cycle for each of these products is only a few months. Thus, the success (or failure) of a single movie at the box office may result in an increase (or decrease) of the market value of the releasing studio, given the weight of a single launch event on the studio's bottom line. As an example, according to *Variety.com*, Pixar's launch of *The Incredibles* in 2004 was followed by an increase of $3.59 (about 10%) in its stock price in one day, pushing the stock to its highest-ever value (Chaney 2004). Conversely, Forbes.com reported that the commercial failure of *Treasure Planet*, a $140-million animated feature that opened with only $16 million, caused Disney to lower its 2002 earnings estimates (Ackman 2002), and the failure of their movie *The Alamo* in 2004 was followed by a drop of 34 cents in its stock price (about 1.5%) (*USA Today* 2004).

The occasional surprise hit or flop does not diminish the need for careful prelaunch planning and resource allocation by studios. Indeed, market response models have been shown to assess a new movie's market potential reasonably well in function of factors that are known before launch (e.g., Neelamegham and Chintagunta 1999). In addition, studios have great discretion over the amount and

Table 1 Movie Studio Market Shares and Gross Box Office Collections for 2004

Distributor	Market share (%)	Total gross $mm ($)	2004 movies	Average gross/movie $mm ($)
Sony	14.30	1,345.40	18	74.74
Warner Bros.	13.00	1,223.80	22	55.63
Buena Vista	12.40	1,166.90	20	58.35
DreamWorks	9.90	936.70	10	93.67
20th Century Fox	9.90	929.50	14	66.39
Universal	9.80	919.30	14	65.66
Paramount	6.70	635.10	14	45.36
New Line	4.40	418.80	10	41.88
Miramax	4.00	374.00	13	28.77
Lions Gate	3.20	302.90	18	16.83
MGM/UA	2.10	199.00	15	13.27
Fox Searchlight	1.90	174.50	10	17.45
Total	91.60	8,625.90	178	48.46

timing of prelaunch advertising they allocate to each project. Because advertising elasticities for motion pictures have been shown to be well above average elasticities reported across industries (Elberse and Eliashberg 2003), these allocation decisions can be expected to have a significant impact on the product's financial performance.

While targeted at consumers, prelaunch movie advertising may also have an impact on investors. As previously noted, each new product launch in this industry influences the quarterly or annual profit picture for the studio. Therefore, we would expect stock analysts and investors to monitor the studio's prelaunch activity. In particular, aggressive advertising signals management's confidence in the movie's potential (i.e., a product quality signal) and can therefore raise investors' expectations of the studio's financial performance. Similarly, a movie that does surprisingly well at the box office, despite modest marketing support, may increase the studio's appeal to investors. Thus the studio's prelaunch advertising strategy may have a direct bearing on stock returns, given the profit expectations-laden environment that characterizes the stock market.

The conceptualization and empirical testing of the relationship between movie advertising and studio stock prices is the subject of our study. We first describe the industry background, and formulate hypotheses. Next we present a methodology and data to test our hypotheses. We then draw our conclusions and discuss managerial applications, limitations, and areas for future research.

Conceptual Development

Background

The efficient capital markets (ECM) hypothesis states that stock prices instantaneously and completely incorporate all information that may affect the future cash flow of the firm. Thus, in the case of motion pictures, a commercial hit should increase stock prices, and a flop should cause them to fall. However, the production and release of a movie is a lengthy process, and the script, cast, budget, and production team is known months before the release of a movie. Studio executives discuss release plans and financial expectations with Wall Street analysts up to one year in advance.[1] Industry publications such as *Variety.com* provide detailed reports on recently announced films. For example, a search for Columbia Pictures on IMDB.com (December 1, 2005) revealed 22 movies in production, including projects that had been announced shortly beforehand, such as *The Da Vinci Code*. Sneak previews for critics as well as audiences, advertising, and press leaks help investors form expectations about the upcoming movie's box office revenues and, by association, the studio's financial performance. Star actors are signed on or dropped from projects, which also affects the earning potential of movies (Elberse 2007). Thus, a movie's impact on studio valuation is assessed over many months, and the expectation of a blockbuster hit could cause a rise in studio stock prices well before the actual release of the movie.

Past research in marketing has quantified the antecedents of movie box office performance, including empirical models (e.g., Sawhney and Eliashberg 1996, Neelamegham and Chintagunta 1999, Ainslie et al. 2005) and experimental models (e.g., Eliashberg et al. 2000). In addition, past research has identified critics as both influencers and predictors of attendance (Eliashberg and Shugan 1997, Basuroy et al. 2003). Thus, stock analysts have access to several indicators to shape their financial expectations for studios.

All these forecasts, however, are conditional on information available prior to movie release, and we would therefore expect them to be adjusted, based on the movie's opening-weekend results. The first weekend is particularly important in the motion picture business, especially for movies that subsequently become blockbusters (Sawhney and Eliashberg 1996). Indeed, for movies released between 1995 and 1998, the first weekend accounted for 24% on average of the total gross. Thus, we would expect a correction in the forecasts based on first-weekend box office receipts. Extending this argument, we also expect to see a correction in studio stock prices, as investors update their expectations of studio performance based on the opening-weekend box office.

Movie Performance and Studio Stock Price

Expected movie performance (and thereby the studio stock price) prior to launch is based on factors

[1] From discussions with studio executives.

such as critical reviews (which are typically available a few days before launch), production budget, star cast, track records of the producer/director, past studio history, time of launch, advertising budget, width of launch (number of screens), and movie genre (Prag and Casavant 1994). Virtually all of this information is publicly available through industry-related websites and trade publications. While media-spending numbers are generally not available in real time, the intensity of spending may be experienced firsthand in the weeks leading up to movie release.

If markets are efficient, all this information would have been incorporated into the studio's prelaunch stock price, without bias. Hence, the excess stock return immediately after the movie launch should be the result of only the actual movie performance *relative* to its prelaunch prediction (after controlling for other coincidental extraneous events in the same time period). Thus, we hypothesize that a movie with high prelaunch expectations that subsequently flops[2] should cause the stock price of the studio to fall. Conversely, a movie with low expectations that succeeds should cause the studio stock price to rise.

The Role of Advertising

On average, 90% of a movie's advertising budget is used in the weeks leading up to the theatrical launch (Elberse and Anand 2007). Given that advertising is a major source of information for the public about the impending arrival of a movie, it is generally accepted that this expenditure has a significant role in a movie's success and will therefore be a significant variable in analysts' prediction of movie gross. The importance of advertising was confirmed in empirical studies by Prag and Casavant (1994), Zufryden (1996), and Elberse and Eliashberg (2003). While exploring the determinants of movie revenues, these authors find that advertising pays off in terms of higher box office revenues. Furthermore, advertising also plays a part in increasing the saliency of the movie in the minds of both moviegoers and investors who follow the industry (Squire 2004). Thus, movies with high advertising support would be expected to have higher revenues, a priori.

Other determinants of prelaunch advertising spending need to be considered as well. In particular, studios may support high production budget movies with higher levels of advertising. Recent research by Kopalle and Lehmann (2006) addressing the dilemma of setting expectations through advertising finds that quality may be overstated for products where initial sales (as opposed to sales in the distant future) are vital. Thus, this research argues that it may be optimal for products with shorter life cycles to overstate quality. Movies are experiential goods with short life cycles, and an overstatement of quality in this case would imply higher prelaunch advertising budgets. However, as argued earlier, these larger advertising budgets can raise the product's revenue expectations to possibly unattainable levels. Similar myopic behavior has been reported in a study across several industries by Mizik and Jacobson (2007). If so, that would have an impact on firm value, as discussed below.

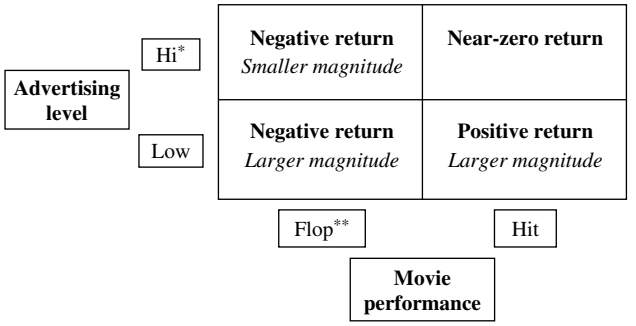
The impact of advertising on stock prices has been recognized in marketing (Joshi and Hanssens 2006, Rao et al. 2004, Srinivasan et al. 2006). Advertising expenditures can have a direct effect (raising a firm's intangible value) and an indirect effect (through increasing sales revenues and profits) on stock prices; these effects manifest themselves over 6–8 months (Joshi and Hanssens 2006). Furthermore, this impact may be moderated by the type of branding strategy used by the firm (Rao et al. 2004). Applying these findings to the motion picture industry, we would expect an indirect impact of advertising on stock prices. Insofar as prelaunch movie advertising raises investor expectations about the product's financial performance, we would expect that studios supporting movies with above average advertising expenditures would experience small or insignificant stock price changes post launch. Indeed, highly advertised movies are unlikely to be *sleeper* hits, i.e., movies that have gradual sales build up and peak several weeks after launch (Sawhney and Eliashberg 1996). Thus, the movie's anticipated performance is already incorporated in stock prices prior to launch, which is rational because advertising spending is known to impact opening revenues (Elberse and Eliashberg 2003). We may even observe a negative stock return post launch if high prelaunch advertising leads to excessive performance expectations that are rarely achieved (Kopalle and Lehmann 2006). On the other hand, for movies with below average advertising, we expect a higher magnitude excess return postlaunch because the actual movie performance is not as easily anticipated. We also expect the sign of the postlaunch excess return to be correlated with movie success, i.e., positive for hits and negative for flops.

Based on these arguments, we advance the following two hypotheses about the relationship between prelaunch movie advertising and stock returns, which are parsimoniously represented in Figure 1:

Hypothesis 1 (H1). *Movies that receive above average prelaunch advertising support will have a postlaunch excess stock return that is smaller in magnitude than movies that receive below average advertising support.*

[2] In what follows we use the terms *success* (*or hit*) and *failure* (*or flop*) to mean profitable and not profitable, respectively. We define a movie to be profitable if its U.S. box office gross exceeds its production and advertising costs. By this definition, only 32% of movies in our database succeed.

Figure 1 Hypothesized Abnormal Returns



Notes. *Advertising for a movie is classified as Hi (Low) if the advertising expenditure for that movie is above (below) the average advertising expenditure for all movies for that studio.

**A movie is classified as a Flop (Hit) if its U.S. box office revenue is less (more) than the sum of its production budget and advertising expenditure.

Hypothesis 2A (H2A). *Movies with above average advertising that succeed* (*flop*) *will have nonsignificant* (*negative*) *postlaunch excess returns*.

Hypothesis 2B (H2B). *Movies with below average advertising that succeed* (*flop*) *will have positive* (*negative*) *postlaunch excess returns*.

Data

Past research on movie box office revenue has identified several variables that impact performance and, hence, the excess return. These variables are listed in Table 2(a). By using the ECM hypothesis and past research, we can predict which of these variables will have an impact on postlaunch stock price. Under the efficient markets hypothesis, any variable that remains unchanged before and after launch can be theorized to have no impact on postlaunch excess return. In contrast, all variables that change post launch can impact postlaunch excess return.

Variables such as MPAA ratings (G, PG, PG-13, etc.), genre (action, romance, comedy, etc.), critical reviews, production budget, time of launch (seasonality), star and director power, distributing studio, and sequel are known before launch and do not change after the movie is launched. Thus, we expect that information related to these variables is efficiently incorporated in stock prices, and we do not expect them to have an effect on postlaunch excess returns.

There are two reasons why any variable may impact postlaunch excess return—inefficient markets and lack of available information prelaunch. Studies in accounting (Kothari 2001) and marketing (Joshi and Hanssens 2006, Pauwels et al. 2004) have demonstrated that markets may not be completely efficient. Furthermore, there are variables about which analysts have incomplete information prelaunch. Individual movie profits are not known. They are estimated by analysts based on other variables (such as the ones noted above) and are therefore stochastic in nature. Also, the relationship between the opening gross of a movie and final gross may not be linear (Neelamegham and Chintagunta 1999). Similarly,

Table 2(a) Description of Variables Used in Analysis

Variable	Description	Source
Advertising	Prelaunch advertising support received by a movie, in $	TNS MI
Profit	Total U.S. box office gross (over a movie's lifetime) − Budget − Advertising	Calculated
Opening gross	Box office gross earned by a movie on the opening weekend	The-numbers.com
Theatres	Number of screens for movie on opening weekend	The-numbers.com
Reviews	Critical reviews for movies, obtained from 3 sources	Blockbuster, Maltin, and TVGen ratings
MPAA	Rating from the Motion Picture Association of America	The-numbers.com/IMDB
Genre	Classification by movie type	The-numbers.com/IMDB
Production budget	Estimated budget to produce the movie	The-numbers.com
Star power	Dummy variable, taking value 1 if movie has any entertainer with salary more than $10 million in 1997	Forbes
Studio	Dummy variable representing which studio released the movie.	IMDB
Sequel	Dummy variable	The-numbers.com/IMDB
Seasonality	Season in which the movie opened, with a dummy variable for the main movie release seasons	IMDB

Table 2(b) Hypothesized Impact of Variables Pre- and Postlaunch

Variable	Impact on stock price before launch	Impact on excess return postlaunch
Advertising	+*	+
Profit	+*	+
Opening gross	+*	+
Theatres	+	+/−
Reviews (CRITIC)	+	0
MPAA	+/−	0
Genre	+/−	0
Production budget	+	0
Star power	+	0
Studio	+/−	0
Sequel	+	0
Seasonality	+/−	0

Notes. "+," "−", and "0" denote positive, negative, and zero expected impact. We use +/− to denote an impact whose direction cannot be predicted.

*Impact of these variables on prelaunch stock price is estimated by analysts.

the amount of advertising support for a movie is not perfectly known prior to launch. The impact of advertising expenditures on final movie revenues and thus profits will only be known once the opening weekend has passed. Finally, distribution (i.e., theatre/screen allocation) is known to lag movie demand (Krider et al. 2005), and thus, the number of screens may change after the launch of the movie. Consequently, we expect that these variables may impact stock return post launch. Table 2(b) summarizes our hypothesized impacts.

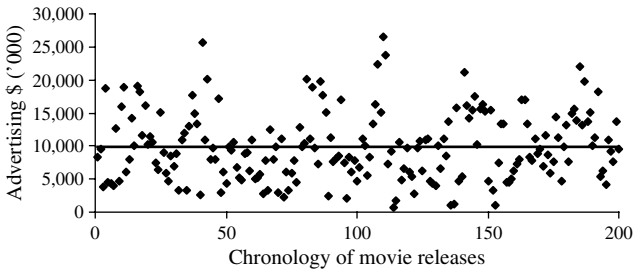
We collected data on all movies launched by the major studios from 1995 to 1998. Variables such as number of opening screens, total box office revenue ($), production budget ($), opening-weekend revenue ($), MPAA rating, distributor, and opening date are publicly available on websites such as IMDB.com and The-Numbers.com. Movie rating data were obtained from the TV Guide Entertainment Network (TVGEN) and Blockbuster websites, giving us three different critical ratings for the movie: TVGEN (scale 1–4), Maltin (scale 1–4), and Blockbuster (scale 1–5). The ratings were converted to a common scale and averaged. Prelaunch media expenditure for the movie was obtained from TNS.[3] These data include the total dollar value of media expenditure across 11 different media up to the release date of the movie in question. The data plot in Figure 2 shows that movie advertising is seasonal as heavily supported movies are typically released in peak seasons such as the fourth of July and Thanksgiving weekends.

Finally, data on studio excess returns are available from the COMPUSTAT/Center for Research Security Prices (CRSP) database. We collected daily cumulative abnormal returns (CARs) for seven major film distribution companies covering the 13 major studios. Table 3 shows the studios in our data set, along with their parent companies. Returns were computed for the week (Monday through Friday) following the theatrical release of the movie. Figure 3 shows some examples of CARs over our five-day event window. To test the sensitivity of our results to the event-window length, we also used 1-day (Monday) and 10-day (Monday through Friday of the following week) windows.

The database was edited to ensure that no studio-specific extraneous events were present during the event window that could bias the results. Thus, we eliminated movies that involved multiple studios (e.g., *Titanic*), as well as movies whose release dates coincided with other major, but unrelated, announcements by the distributing studios. For example, *Beloved*, distributed by Buena Vista (a unit of Disney), was eliminated from our database because on the Wednesday after the movie's launch, *The Wall Street Journal* featured an article entitled "Disney's Net Fell 28% in Fourth Quarter On Asia Weakness, Unit Restructuring." Only movies with wide release (over 500 screens at launch) were considered. Finally, any movie with incomplete data on variables such as production budget, advertising or stock return was also omitted. These qualifications resulted in a database of 200 movies, released between 1995 and 1998, of which we use 190 movies for our analysis and 10 movies for out-of-sample prediction.

[3] Ad$pender data supplied by TNS Media Intelligence (TNS MI).

Figure 2 Scatter Plot of Prelaunch Advertising for All Movies in the Database



Note. *Each data point represents a movie in our database. The solid line shows the average advertising.

Research Methodology

Predicting the actual value of stock price corrections post launch is not a straightforward task. The level of corrections made by investors can depend on numerous factors, both internal and external to the firm (studio) under consideration.[4] One way around this problem is the use of event-study analysis (Ball and Brown 1968). This method eliminates the dependence on accounting information, assuming that markets are efficient,[5] and allows for an inference of cause and effect in a quasi-experimental setting. We will use the event-study methodology to analyze the impact of opening weekend. By considering the excess return of the studio stock for the week after the movie's opening weekend, we ensure that the observed change in excess return stems from investors' adjustment of their performance forecast for that movie and its financial impact on the studio. The excess return for a stock is the expost return of the stock during the course of the event window, less the normal expected return had the event not taken place (Srinivasan and Bharadwaj 2004).

The excess or abnormal return for a stock is calculated as follows:

$$\varepsilon_{it} = R_{it} - \alpha_i - \beta R_{mt}, \quad (1)$$

[4] In what follows we use the terms firm and studio interchangeably.

[5] All event studies are joint tests of the hypothesis under consideration as well as the efficiency of capital markets.

Table 3 Movie Studios and Parent Companies

Studio	Parent corporation	Stock symbol
20th Century Fox	News Corp.	FOX
Metro Goldwyn Mayer	MGM*	MGM
United Artists		MGM
Sony Corp	Sony Corp.	SNE
Columbia Pictures		SNE
Warner Bros	AOL Time Warner	AOL
New Line		AOL
Buena Vista	Disney	DIS
Touchstone		DIS
Miramax		DIS
Dimension Films		DIS
Paramount	Viacom	VIA
Universal Studios	Vivendi Universal	V

*MGM was acquired by Sony in 2004.

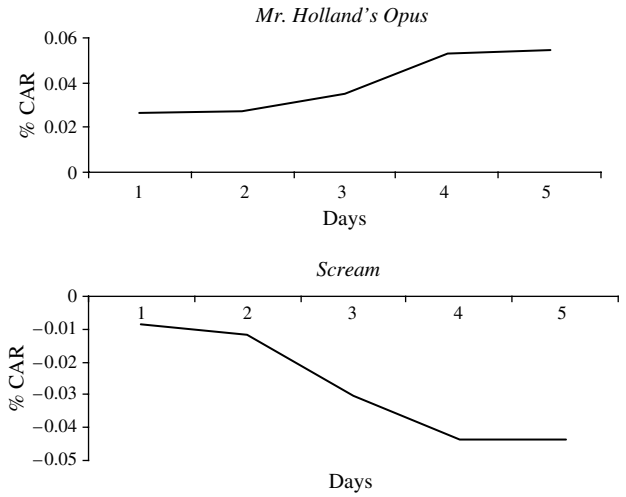
where R_{it} is the period t return on stock i, R_{mt} is the period t return on the market portfolio, and α, β are the standard parameters in the market model. The excess return is then aggregated over the length of the window after the event to arrive at CAR. The statistical significance of the excess return is calculated by dividing the CAR by its standard error.

Model Development

Because we are testing the impact on stock price of expected versus actual results for a movie, we begin our analysis by estimating a model of expected opening-weekend box office gross:

$$\begin{aligned} OPEN\_GROSS_i = {} & \alpha_0 + \alpha_1(BUDGET_i) \\ & + \alpha_2(THEATRES_i) + \alpha_3(AD_i) \\ & + \alpha_4(AD_i)^2 + \alpha_5(CRITIC_i) \\ & + \alpha_6(SEQUEL_i) + \alpha_7(STAR_i) \\ & + \alpha_8(MPAA_i) + \alpha_9(SEASON_i) \\ & + \alpha_{10}(GENRE_i) + \varepsilon_i, \end{aligned} \tag{2}$$

Figure 3 Examples of CAR



where

$OPEN\_GROSS_i$ = Opening-weekend U.S. box office gross for movie i, in U.S.$;
$BUDGET_i$ = Movie production budget, in $;
$THEATRES_i$ = Number of screens at launch;
AD_i = Demeaned prelaunch media (advertising and promotion) for the movie, in $. We use studio-specific averages for demeaning;
$CRITIC_i$ = Average of Blockbuster, Maltin, and TVGEN critical ratings (reviews);
$SEQUEL_i$ = Dummy variable, taking the value 1 if movie i is a sequel;
$STAR_i$ = Dummy variable, taking the value 1 if movie i has at least one star actor[6];
$MPAA_i$ = Series of dummy variables representing the MPAA rating for the movie;
$SEASON_i$ = Series of dummy variables for the five main movie release seasons (January–March, April–May, Memorial Day–July, August–November, Thanksgiving–December);
$GENRE_i$ = Dummy variable for genre of movie i. A movie may have more than one genre (for e.g., action/comedy).

We assume normally distributed errors (an assumption we subsequently test), allowing for the use of ordinary least squares (OLS) estimation. The difference between the estimated *OPEN_GROSS* and actual opening-weekend gross is the opening shock (*OPEN_SHOCK*). We then use OLS to estimate the relationship between *OPEN_SHOCK* and CAR, (which is obtained as described above):

$$CAR_i = a_0 + a_1 * OPEN\_SHOCK_i + \varepsilon_i. \tag{3}$$

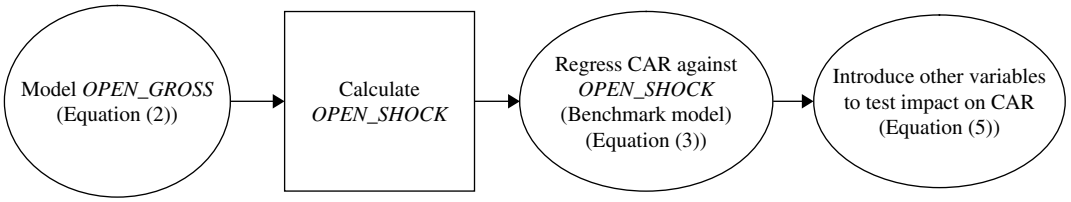
Model (3) is our benchmark model. To test our proposed Hypotheses H2, we also need to estimate a relationship of the form

$$\frac{\partial(CAR_i)}{\partial(PROFIT_i)} = \alpha_0 + \alpha_1 * AD_i, \tag{4}$$

which implies that the marginal effect of *PROFIT* (determined based on opening gross) on excess return is a function of the prelaunch advertising

[6] *Stars* are defined as entertainers with earnings greater than $10 million in 1997, as per *Forbes* magazine.

Figure 4 Modeling Steps



support (AD_i) received by movie i. Therefore the CAR response model should include an interaction term ($AD * PROFIT$).

The model also includes the advertising terms AD and AD^2, which capture the main and decreasing-returns effects of advertising, as well as *PROFIT* to capture the direct effect of profit. Figure 4 illustrates the steps in our analysis.

With regard to advertising support, we analyze our data in two ways. First, we use AD as above, with studio-specific advertising means. This allows us to classify movies as above average and below average in media support. Using studio-specific means rather than overall mean makes our findings more applicable managerially, as studio executives can relate to what above and below average imply for their firm.[7] Second, we use media dollars spent per launch screen (*AD_INTENSITY*), which provides an estimate of the advertising support relative to the distribution of the product. For example, a movie released on 2,000 screens with an advertising budget of $10 million would have the same advertising intensity as that of a movie released on 1,000 screens with $5 million in advertising support. The *AD_INTENSITY* measure was demeaned as well, so that movies are classified as receiving above average or below average advertising support relative to their distribution.

We define the profit (*PROFIT*) made by a movie as its total U.S. gross ($) minus the production and media costs.[8] This is a straightforward definition of net income that, in the motion picture industry, is not announced by the studios for individual releases. The actual calculation of accounting profit is fairly complex, even with the availability of all relevant costs and revenue sources. A movie earns revenue from box office receipts, international box office, home video sales, pay-per-view, TV rights (cable and network), merchandising, and, lately, related video games. Of that revenue, the studio receives varying percentages, depending on prior agreements. Similarly, the production or negative cost[9] is one of many cost elements, with postproduction, media, promotion, bonuses, screening, and other costs still to come. Furthermore, studios have nonlinear payment agreements with exhibitors, whereby studios typically take 90% of box office receipts (after covering exhibitor screening costs, called the *Nut*)[10] in the first two weeks; this percentage gradually decreases over time.

Given these industry procedures, our simple movie profit metric is appropriate for answering our research questions. Indeed, industry publications, including Kagan (1995), indicate that domestic box office receipts should approximate the negative cost for a movie to break even. We apply a more stringent definition of break even (or profit) by including media expenditures along with negative costs.

Results

We first estimate the difference in excess returns for movies that were supported with above average media spends, compared with those with below average media spends. This difference has a t-statistic of 2.12, which is statistically significant at $p < 0.05$. The absolute values of the means are 0.0117 (for 131 movies with below average media spend) and 0.0075 (for 69 movies with above average media spend), with an average difference in CAR of 0.0042. Thus, the stock market displays larger postlaunch adjustments for lesser-hyped movies (as defined by lower media spend for that movie) than for well-advertised movies, which is consistent with our Hypothesis H1.

These results hold for event windows of 1 day as well as 10 days. While the absolute value of means is lower for the one-day window, the difference in abnormal return between below average and above average movies is still significant (difference of 0.0028, t-statistic of 2.86). The absolute values are larger for the 10-day window, but the difference is again comparable and significant (0.0030, $t = 1.90$). Thus, the event-window sensitivity analysis reveals, first, that

[7] We thank an anonymous reviewer for this suggestion. Classification as above median and below median does not significantly change our results.

[8] Our results are not sensitive to this definition of profits, under the assumption that industry analysts recognize the relationship between opening-weekend gross and final movie profits.

[9] *Negative cost* is an industry term, and covers the cost of production, excluding gross participation, studio overhead, and capitalized interest. See Vogel (2004) for details.

[10] The *Nut* includes location rent, telephone, electricity, insurance, and mortgage payments.

Table 4 Prediction Equation for *OPEN_GROSS*

Variable	Coefficients*	Standard error	*t*-statistic
INTERCEPT	**−4,542**	**2,302**	**−1.97**
BUDGET	0.00002	0.00002	0.75
THEATRE	**8.12**	**1.69**	**4.80**
AD	**0.73**	**0.17**	**4.29**
AD^2	**−0.00002**	**0.00001**	**−2.39**
CRITIC	−105	248	−0.42
SEQUEL	**6,122**	**1,951**	**3.13**
STAR	**6,388**	**1,451**	**4.40**
PG	**−3,513**	**1,595**	**−2.20**
R	−623	1,082	−0.57
SEASON	−401	419	−0.95
SCI FI	**7,161**	**1,892**	**3.78**
ACTION	−1,011	1,585	−0.63
COMEDY	−221	1,220	−0.18
DRAMA	455	1,218	0.37
FAMILY	−153	1,839	−0.08
ROMANCE	−91	1,485	−0.06

*Coefficients in bold are significant at $p < 0.05$.

one day is not sufficient to incorporate all available new information in the stock price, or, alternatively, that all relevant information is not available by Monday.[11] Second, it reveals that using a longer event window may lead to data contamination; i.e., there are other related events in the window (for example, the studio may release another movie on the second weekend). The problems with using longer windows as well as benefits of shorter windows are well documented (Srinivasan and Bharadwaj 2004). In what follows we therefore report results from the five-day event window (Monday–Friday).

Next, the model in Equation (2) was estimated. The parameter estimation results are displayed in Table 4. The R^2 of 0.81 and overall *F*-value of 22.8 indicate that opening gross is reasonably well predictable from available prelaunch data. The Jarque-Bera test statistic is 0.60 ($p < 0.74$), supporting our assumption of error normality.

Finally, we estimate the impact of *OPEN_SHOCK*, obtained as the prediction error of Equation (2), on CAR. This is a benchmark CAR model (Equation (3)), shown as Model A in Table 5, reflecting perfect market efficiency. The table also reports models with additional explanatory variables (Models B–D), following our earlier hypotheses. Model B shows the impact of *OPEN_SHOCK* and *PROFIT*, while Model C includes *AD* and AD^2 in addition to Model B. Model D is the fully defined model containing all known information:

$$CAR_i = \alpha_0 + \alpha_1(PROFIT_i) + \alpha_3(THEATRES_i) + \alpha_4(AD_i) + \alpha_5(AD_i)^2 + \alpha_6(BUDGET_i) + \alpha_7(CRITIC_i) + \alpha_8(OPEN\_SHOCK_i) + \alpha_9(AD_i * PROFIT_i) + \alpha_{10}(MPAA_i) + \alpha_{11}(COMP_i) + \alpha_{12}(SEQUEL_i) + \alpha_{13}(STAR_i) + \varepsilon_i. \quad (5)$$

[11] Note that it is common studio practice to adjust previously reported weekend box office earnings by the middle of the following week.

Table 5 Summary of Significant Effects from CAR Regressions*

Variable**	Model A	Model B	Model C	Model D
OPEN_SHOCK	5.64	5.49	5.48	5.44
	(3.14)	(3.35)	(2.91)	(3.30)
PROFIT		1.9	2.28	2.09
		(5.01)	(5.96)	(5.72)
AD_INTENSITY			636	613
			(2.06)	(2.11)
AD_INTENSITY^2			−0.43	−0.46
			(−2.00)	(−2.06)
AD_INTENSITY $*$ *PROFIT*				−0.0001
				(−2.04)
R^2	0.20	0.37	0.40	0.44
Adjusted R^2	0.04	0.13	0.14	0.15

*For the sake of brevity, this table only shows significant variables in the models. Figures in brackets ( ) are *t*-statistics.
**All coefficients are multiplied by 10^{10} for readability.

For the sake of clarity, and because we expect most of these variables to have no impact on CAR, we only report significant variables in Table 5. We assessed the degree of collinearity by estimating the variance inflation factors (VIFs). As none of the VIFs exceeded the value 10, we conclude that collinearity among the estimates is negligible.[12]

Table 5 shows that model fit (R^2) improves from 0.20 for the benchmark model (A) to 0.44 for Model D. We obtain the same substantive results (sign and significance of key coefficients) by using either AD or *AD_INTENSITY* as an explanatory variable. For the sake of brevity, we will only discuss the coefficients from the *AD_INTENSITY* regression.[13]

Consistent with our hypothesis, opening-weekend revenue surprises affect stock price. Thus, investors react to previously unexpected commercial success (or failure). In addition, the positive *PROFIT* effect implies that while actual accounting profits may not be realized for several months from the release date of the movie, the stock market anticipates the future profit figure based on first-weekend results and appropriately adjusts the studio stock price. Thus the stock market incorporates both short-term revenue shocks and long-term profit outlook for the product.

Media expenditures (*AD_INTENSITY*) have a positive effect on postlaunch returns, with diminishing

[12] Detailed results available on request.

[13] In addition, we estimated the fully specified model by including studio dummy variables. None of these studio dummy variables were significant at $p < 0.05$. Other response parameters were of comparable magnitude.

returns to scale (negative and significant *AD_INTENSITY*^{2}). In addition, the *AD_INTENSITY* $*$ *PROFIT* interaction term is significant and negative. This implies that movies with below average advertising that are hits, provide a positive stock return. Similarly, flops with above average advertising are associated with a negative stock return. Finally, hit movies with above average advertising expenditures *can* have a negative excess return, depending on the size of the profits and advertising spending. Such a negative excess return may result from a prelaunch overestimation of movie revenues caused by intense advertising. This high revenue anticipation leads to higher prelaunch stock price, which is then corrected once the opening-weekend box office results are available.

Our results also imply that there may be a change in CAR even for a movie that performs as expected on the opening weekend (*OPEN_SHOCK* is zero). This is explained by the fact that *OPEN_SHOCK* is based on a stochastic *prediction* of *OPEN_GROSS*. Thus, even an insignificant value of *OPEN_SHOCK* contains information, namely that of confirming prelaunch predictions. As demonstrated by the results of Model 4 (Table 5), advertising and profits can have an impact on postlaunch CAR, even if the opening-weekend performance meets expectations (i.e., $OPEN\_SHOCK = 0$).

As expected, the coefficients for *RATINGS*, *BUDGET*, and *SEQUEL* are not significantly different from zero. Similarly, the number of screens (*THEATRE*) is not significant, indicating that any postlaunch changes in number of screens are already incorporated in the *OPEN_SHOCK* variable.[14] For example, disappointing movies are expected to see a reduction of screens, while surprise hits will see an increase in screen allocation.

Overall we find broad support for our Hypotheses H2A and H2B. Media support, while affecting the box office performance of a movie, also has an impact on studio stock return. Highly promoted movies have a lower (in magnitude) abnormal stock return than movies with lesser media spend. Furthermore, aggressive prelaunch media spending may lead to unrealistic movie performance expectations, which are followed by a downward stock price correction post launch.

Simulations and Managerial Implications

Our finding of significant postlaunch abnormal returns invites the question of whether these returns are preceded by prelaunch abnormal returns in the opposite direction, just prior to launch (prelaunch hype), or whether the build up of expectations occurs over many months, as we hypothesize.[15] We check the robustness of our hypothesis for the ten out-of-sample movies selected. For each movie, we calculate the prelaunch CAR (CAR_{pre}) over a five-day window and then compare it to the postlaunch CAR already estimated. If CAR_{pre} is strong and consistently of the opposite sign to CAR post launch, that would lend support to the prelaunch hype hypothesis, while our hypothesis of long-term expectations build up would be supported by insignificant (or minuscule) values of CAR_{pre}.

Table 6 Comparison of Pre- and Postlaunch Cumulative Abnormal Returns

Movie title	CAR post	CAR pre	Difference
Steel	−0.0112	0.0004	0.0116
Dr. Dolittle	0.0069	0.0013	0.0056
Sudden Death	−0.0041	0.0000	0.0041
The Prophecy	0.0000	0.0000	0.0006
She's So Lovely	−0.0069	−0.0008	0.0061
The Edge	0.0000	0.0000	0.0000
Powder	0.0101	0.0000	0.0101
That Thing You Do!	0.0000	−0.0003	0.0003
Alaska	−0.0086	−0.0021	0.0065
Nine Months	−0.0069	0.0004	0.0073
Average error	0.0055	0.0006	0.00522

*CAR post is the postlaunch CAR, and CAR pre is the prelaunch CAR, both over a five-day window. All entries are statistically significant at $p < 0.05$ except where noted as 0.0000.

Our results, displayed in Table 6, indicate that the average (absolute) prelaunch CAR for the 10 movies was 0.0006. In contrast, the average absolute CAR post launch was 0.0055, about nine times higher. Prelaunch CARs have an opposite sign from postlaunch CARs in only two cases, both with very small values. Furthermore, in only one case do we find that $|CAR_{pre}| > |CAR|$, although both values are near zero. We conclude that investors obtain significantly more information post launch than in the week leading up to the launch, and that our results are not due to investor adjustments to last-week prelaunch hype.

We address the managerial relevance of our findings in two ways. First, we predict the CAR for the 10 out-of-sample movies and compare our predictions with actual observed CARs. Second, we simulate the impact of different advertising investments on movie performance and studio stock price. As in our hypotheses, we analyze four scenarios, with high and low levels of prelaunch advertising support, followed by movie success or failure leading to postlaunch excess returns.

[14] However, it can be noted that the *THEATRE* variable is in the denominator of the *AD_INTENSITY* variable, which is significant. We thank the area editor for pointing this out.

[15] We thank an anonymous reviewer for this suggestion.

Table 7 Holdout Sample CAR Predictions

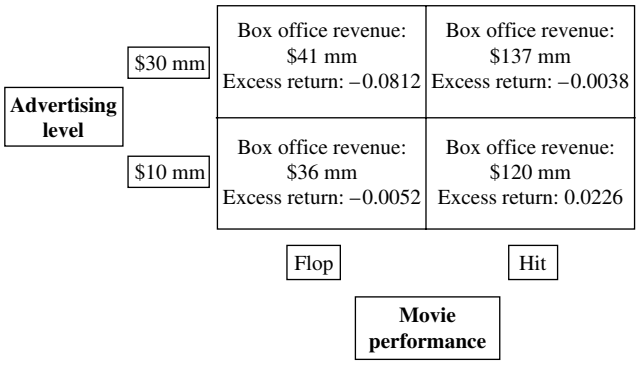
Movie title	Actual CAR	Predicted CAR	Difference
Steel	−0.0112	−0.0101	−0.0011
Dr. Dolittle	0.0069	0.0173	−0.0104
Sudden Death	−0.0041	−0.0016	−0.0025*
The Prophecy	0.0000	−0.0007	0.0007
She's So Lovely	−0.0069	−0.0028	−0.0041
The Edge	0.0000	−0.0008	0.0008
Powder	0.0101	0.0032	0.0069*
That Thing You Do!	0.0000	−0.0014	0.0014
Alaska	−0.0086	−0.0040	−0.0046
Nine Months	−0.0069	−0.0048	−0.0021

*Significant at $p < 0.10$.

Table 7 displays the results of our prediction for a holdout sample of 10 movies. These movies were randomly selected from our original sample, and we predicted the CARs using the parameters obtained from Model 4 above. Although individual forecast errors vary, our model performs well in indicating the direction and size of the abnormal return in all cases with nonzero returns.

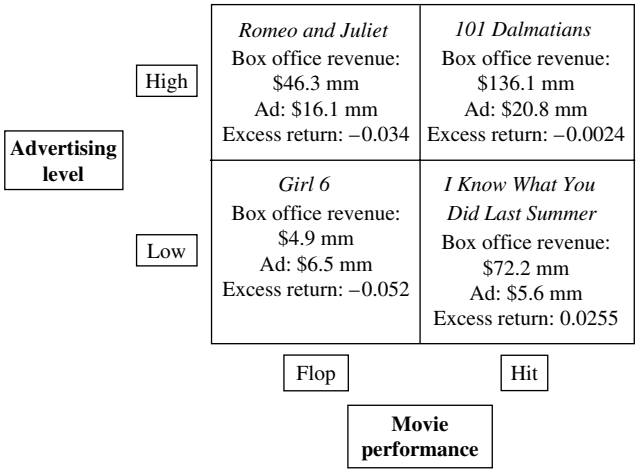
To demonstrate the dual effect (indirect and direct) of advertising on firm value, we perform a simulation. The advertising support will have the dual effect of drawing consumers to the movie, as well as raising the saliency and the prelaunch expectation of the movie (the *indirect* and *direct effects*, respectively, following the terminology in Joshi and Hanssens 2006). Past research has found that prelaunch advertising is effective in the first week of the launch, while word-of-mouth effects are predominant thereafter (Elberse and Eliashberg 2003). Further, in our data set, the opening weekend accounted for about 24% of the total U.S. gross for a movie. We assume that a movie is produced with a budget of \$40 million, which is near the database average of \$39 million. The movie is then launched on 2,000 screens in the United States (database average is 1,955), and supported with either \$10 million or \$30 million in advertising

Figure 5 CAR Simulation for a Hypothetical Movie*



Note. *Assuming that prelaunch advertising only impacts 1st-week box office revenue, which is about 25% of total revenue.

Figure 6 Actual Examples Similar to Hypothetical Movie



(the database average is \$13 million). Based on our estimates, we examine two scenarios. If advertising spending is modest (\$10 million), the movie grosses either \$120 million (hit) or \$36 million (flop). By contrast, under a high-advertising scenario (\$30 million), the same hypothetical movie would have a U.S. box office gross of \$137 million (success) or \$41 million (flop). This follows from the advertising elasticity of 0.28 obtained from Equation (2), which is comparable to elasticities obtained in similar studies, such as 0.26 by Elberse and Eliashberg (2003).

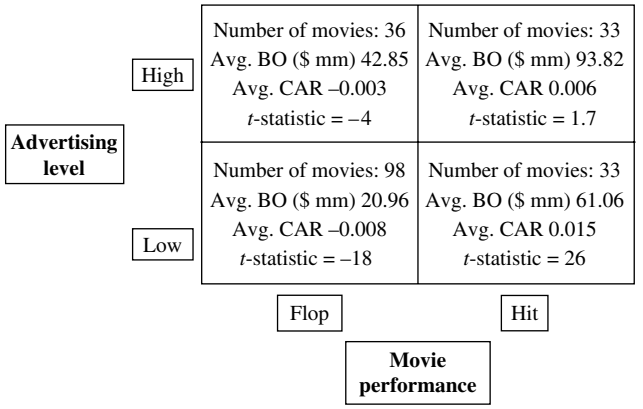
We can now calculate the excess stock return associated with these four scenarios. The results of the simulation are displayed in Figure 5. They highlight advertising's dual effect of raising movie saliency in the minds of potential viewers (captured by increased box office revenues for highly advertised movies) and raising investor expectations on the product's financial performance. A sleeper hit (a movie with modest advertising that succeeds, e.g., *The Blair Witch Project*) leads to a positive excess return of 0.022. However, its box office revenues are \$17 million below the high-advertising intensity scenario. In contrast, a highly advertised hit leads to a small negative excess return of −0.0038,[16] and a highly advertised flop is associated with a stronger negative excess return. This example highlights our finding that the negative excess return is a function of the direct effects of profit and advertising, as well as the interaction effect.

We provide two external validations of these simulation results. First, we examine four movies in the database that match our simulation scenarios closely, as shown in Figure 6. The actual CAR results for these movies follow our predicted pattern closely.[17] Second,

[16] If the production budget is reduced to \$30 million, then we obtain a positive excess return for this scenario as well, although its magnitude would be less than for a sleeper hit.

[17] We thank an anonymous reviewer for this suggestion.

Figure 7 Descriptive Statistics for Four Scenarios



we show the average CAR values for all movies in the database, categorized as in the simulation, in Figure 7. Here, too, we conclude that the abnormal return patterns follow our predictions.

Conclusions

In this paper we relate marketing actions to their financial consequences within the context of the movie industry. In analyzing the impact of a single new product release (movie) on studio stock price, we demonstrate the *indirect* effect of advertising on firm value, whereby advertising impacts stock prices through sales stimulation. Our results indicate that excess postlaunch stock returns are a function of the performance of the movie, as well as expectations of that performance that were built up prior to release. We theorize that media spending by studios for audience development drives up that expectation, and that analysts predict stock market reactions based on media data. Our findings that highly advertised movies are associated with smaller postlaunch excess returns and more pronounced downward adjustment of postlaunch stock prices lend credence to our hypotheses.

With the growing importance of financial metrics in marketing (Gupta and Zeithaml 2006), it is now critical to demonstrate the shareholder impact of marketing actions. Our research is the first to link prelaunch movie advertising to studio stock performance. While our results have direct implications for investors, they should be of interest to studio executives as well. Every year, a studio prepares and presents a portfolio of new motion pictures to the public (viewers and investors). In so doing, they should aim to allocate scarce advertising resources to these new products in reasonable ways, i.e., supporting the deserving products and not overhyping products with questionable market potential. Indeed, overhyping creates exaggerated expectations that can produce undesirable effects: higher prelaunch marketing costs and a postlaunch negative stock price correction. In addition, investors may lose confidence in the studio's management over time if overhyping occurs frequently. Careful prelaunch demand assessment followed by tracking research can be very helpful in attenuating these problems. For example, the forecasting models proposed by Elberse and Eliashberg (2003) and others show that movie characteristics, combined with variables that are under studio control (in particular, number of screens and advertising spending), can be used to form realistic expectations about a movie's market potential. In addition, virtual stock market readings can be used to update these expectations as the launch weekend approaches (Foutz and Jank 2007). Finally, studios can conduct in-house audience tests on the entertainment value of their product. While opening-weekend revenue prediction remains challenging, these prelaunch information sources can significantly improve the practice of prelaunch advertising allocations for the studios.

Our findings point to questions left unanswered in this research. Despite our comprehensive motion picture database, there remains an opportunity to analyze the effect of variables such as limited release, movie piracy, and lead actor/actress endorsement for the movie. It would also be interesting to study heterogeneity of stock market reaction across studios, and to focus on the impact of sequels. Other possible extensions include studying the interaction of variables such as star power with the opening box office surprises and studying the differential impact of CAR by studio.[18] Finally, it would be interesting to analyze the impact of marketing support on other studio revenue streams, such as DVD and video game sales, and their interaction with a movie's theatrical performance.

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[18] We thank the area editor for these suggestions.

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