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SHORT PAPER

Stock market response to changes in movies' opening dates

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Abstract How does the market react to news regarding large uncertain projects? We analyze stock market reactions to information about changes in opening dates of movies, and present two main findings. First, we find systematic negative stock price responses to the scheduling changes we consider, suggesting that any changes are interpreted as bad news by the market. Second, we find that the market reaction is greater for movies with higher production costs, but is unrelated to subsequent box office revenues. This may point to a limited ability of the market to predict the box office performance of a movie, and to increased sensitivity of the market to cost effects, which are easier to forecast.

Keywords Motion pictures · Release dates · Stock market response

1 Introduction

This article studies the stock market reaction to announcements about changes in movies' opening dates. The unique data and setting allow us to gauge the market reaction to specific projects. In most settings, this is not a trivial empirical task, as corporate projects often take many years to come to fruition (Esty 2001) and their

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success may be difficult to measure in isolation or to even observe (since firms do not have to report project-specific information).[1]

We present two empirical findings. First, the market response to announcements about any changes in opening dates of movies is, on average, negative, suggesting that changes in plans are interpreted by the market as bad news. Second, we find that the magnitude of the stock market response is significantly associated with the size of the movie, as measured by its production costs. However, measures of the movies' subsequent financial success, such as box office revenues, are unrelated to the market reaction, indicating a limited ability of the market to predict future success of movies. This may also indicate that the market response may be primarily concerned with cost overruns rather than with the effect of announcements on subsequent revenues.

Our findings contribute to several areas of research. Our first finding is similar in spirit to a large literature in finance, which reports negative market reaction to a wide array of corporate changes. For example, Palmrose et al. (2004) find that the market reaction to earnings restatements, even ones that appear to improve transparency, is uniformly negative, and Graham et al. (2008) find that the reaction of the bond market to earning restatements is always negative. Thus, similar to what we document, the market seems to be skeptical of any alteration to previously provided information. These results and our findings are also consistent with a large literature on negative abnormal returns for acquirers in mergers,[2] and with the seemingly surprising results in Esty (2001), who documents an "across the board" negative market reaction to announcements of newly minted large projects.[3]

Second, this article contributes to the industrial organization literature regarding pre-market announcements (Christensen and Caves 1997; Doyle and Snyder 1999; Dranove and Gandal 2003; Caruana and Einav 2008). It is often suggested that such pre-market interaction is some form of a cheap talk; our documentation of a systematic market response suggests that at least in the motion picture industry, the market takes pre-market announcements seriously and responds to them. Finally, our second finding regarding the limited ability of the market to predict box office success is consistent with a large literature that emphasizes the highly uncertain environment underlying the motion picture industry (see, e.g., Ravid and Basuroy 2004; Walls 2005; and the references therein). Methodologically, this study is similar in its approach to two other recent articles that apply event study analysis to different types of events also associated with motion pictures (Elberse 2007; Joshi and Hanssens 2009).

[1] See Fama (1998) for a discussion of the many confounding issues involved in studies of long-term performance.

[2] See, for example, Bradley et al. (1988) and Andrade et al. (2001).

[3] In a related article, Elberse (2007) finds that there is no market reaction to announcements of star participation in movies. However, she also finds that in the Hollywood Stock Exchange prediction market, such announcements increase revenues by only three million dollars on average, which may not substantially affect the value of a large corporation. On the other hand, Joshi and Hanssens (2009) study arguably bigger events (movie releases and advertising campaigns) and find significant abnormal stock returns.

2 Data and empirical strategy

We collected data on announcements of changes in release dates of movies. Release dates are obtained from "The Feature Release Schedule," which is published monthly by *Exhibitor Relations* and is available to various industry players (studios, theaters, analysts, etc.) by subscription. Every month (typically the first Monday of the month), the publication aggregates information collected from studios, and lists all current and future movie releases. A future release date can either take the form of an exact date (e.g., "May 26, 2008"), can be more vague (e.g., "Memorial Day, 2008," "May 2008," or "Summer 2008"), or the movie can simply be listed as "coming" if the movie entered the production pipeline, but no specific information about timing is available. Vague dates are more common early on, long before the projected release date. Typically, a movie will appear in the publication about a year before its actual release, but a specific release date will be announced only about 6 months after that. However, there is a large variation across movies, and it also occasionally happens that a vague date is reported for a movie that was earlier associated with an exact date (e.g., a projected release date of "October 17, 2007" is changed to "Fall 2007"). Einav (2002) provides a more detailed description of these data.

We consider a change to the release date schedule if a movie is listed in two consecutive months of the publication, with different projected dates. That is, an event occurs if the distributor of a movie has changed the way the movie is listed in the publication compared to the way it was listed a month earlier. In order to focus on events that a priori may have more impact, we restrict attention to movies that have been already scheduled to a specific date, and define a "big event" if either one of the following conditions applies: (a) a release date changes from a specific date to another specific date, with the new date being more than 60 days apart (later or earlier) from the original date; or (b) a release date changes from a specific date to a vague date. The reason for choosing a big switch is that most movie producers and distributors tend to be large companies or parts of large conglomerates. It is unlikely that minor events tied to one specific project will make much of a difference to a conglomerate stock price (Elberse 2007).[4] In contrast, the costs and revenues of an event movie are several hundred million dollars, and an important change in either the expected costs or the revenues could have a dramatic effect on profits. Indeed, as we show in Table 1, the cost and revenues of the movies in our data could be as high as 6% of the gross profits and on average they are about 25% of the net profits of the companies in our data. The data is highly heterogeneous in this regard, ranging from specialized companies such as Orion Pictures whose values are likely to be significantly affected (in percentage terms) by one large project to large conglomerates (e.g., Time Warner or Disney) who are less affected.

Release dates can move forward or backward in time. Often, but not always, a deferred release date means production delays. Changing a specific date to a vague date may imply that the studio is "back to the drawing board" regarding the

[4] As described in Einav (forthcoming), smaller switches (of several weeks) are largely done for strategic reasons, as part of the release date timing game played among studios. Larger switches, which often shift the movie from the audience it was designed to target, are mostly associated with production delays.

Table 1 Summary statistics of financial data

	Obs.	Mean	Std. dev.	10th pctile	50th pctile	90th pctile
Production cost ($M)	215	31.5	23.7	11.4	24.2	65.9
Box office revenues ($M)	226	33.6	37.5	4.7	20.4	76.6
Market capitalization ($M)	226	11,216.4	14,918.1	165.7	5,790.9	28,615.6
Prod. cost/market cap	215	0.0430	0.0831	0.0009	0.0043	0.1280
B.O. revenues/market cap	226	0.0485	0.1156	0.0005	0.0046	0.1315
Gross profits ($M)	226	5,811.6	6,558.7	255.3	3,405.5	15,003.9
Prod. cost/gross profits	213	0.0208	0.0405	0.0022	0.0074	0.0603
B.O. revenues/gross profits	224	0.0258	0.0569	0.0008	0.0058	0.0671
Net profits ($M)	226	586.4	932.6	−344.4	553.8	1,830.7
Prod. cost/net profits	213	0.246	1.114	−0.073	0.025	0.414
B.O. revenues/net profits	224	0.248	1.060	−0.064	0.023	0.307
Long-term debt/total assets	226	0.245	0.124	0.102	0.217	0.392

The table is based on the subsample of all events for which we could match Compustat financial data. All dollar figures are in 2000 inflation-adjusted U.S. (million) dollars. Market capitalization data are based on the event date, while profit and debt data are based on the end of the year during which the event took place. Eleven observations are missing production cost data, and profits are zero in two other observations. We note that many observations are associated with the same studios (but different movies of each studio)

specified movie, or that there is some disagreement within the studio regarding the opening date or month of the movie. Both reasons may reflect some uncertainty about the progress of the project. In our final dataset, only 14% of the events are announcements of an earlier release date.

The original dataset contained 697 such events covering the period from 1985 to 1999. We use the date of the published report in which the change is made as the date of the event. Since some movies had several release time changes in our dataset, we have 535 unique movies produced by 32 studios. In order to use standard event study methodology, we must consider only announcements by studios owned by publicly traded firms. In particular, daily return data for the stock of the firm must be available from CRSP for a sufficient period around the event date.[5] Dropping events with insufficient stock data left us with 587 events. The 697 events occur on only 174 dates. It is not uncommon for a studio to "reshuffle its deck" and, at the same time, change the release dates of two or more of its movies. We eliminate all such cases since multiple events at the same time may confound the analysis.[6] Our final dataset contains 302 changes made on 156 dates concerning 260

[5] Some studios have switched between being publicly and privately owned one or more times during the period we study, and so we cannot necessarily analyze all the announcements of a given studio. In addition, some studios have been sold by one public company to another (in some cases, another studio), and so we must keep track of ownership status as of the date of each announcement.

[6] We allow announcements from different companies on the same day, since it seems unlikely that there will be any correlation between the projects of different studios, especially as they often happen at the same time but involve different time periods.

movies distributed by 25 different studios. One hundred and fourteen of these (38%) have specific new release dates, while the rest include changes to a vague date.

The finance literature uses "event study" methodology to assess the market valuation of the impact of any corporate event. The idea is first to calculate expected returns for a given company on a given day in the absence of the event and then compute "abnormal returns," that is, returns that are presumably due to the event. The simplest way of calculating expected returns is to find a "beta," which essentially measures the long-run correlation between the company's stock returns and the market returns. We then use the predicted expected return, and define the residual change in stock value as the "abnormal return," which reflects the market reaction to the news. Specifically, we use *Eventus*[7] for our abnormal return calculations. Since events for a given studio often occur as little as 1 month apart, it is difficult to calculate the "beta" for a market model of stock returns. Therefore, we follow the literature in calculating abnormal returns relative to a market index.[8]

In addition, we collect financial data—production costs and box office revenues—about the movies from *Baseline/FilmTracker*. We also use film genres and ratings from *AC Nielsen*. These are found to be important characteristics of films in other studies (Ravid 1999; De Vany and Walls 2002; Fee 2002; Ravid and Basuroy 2004), and so we use them here as control variables. We also match the events with companies' financial information (market capitalization from CRSP, and other financial variables from Compustat). All the financial variables are adjusted for inflation, given the long time period in question. These variables are summarized in Table 1.

3 Results

Table 2 presents abnormal returns for the entire sample. In this table, we show the evolution of day-to-day returns. For example, between the end of the event date and the end of the day after, we estimate a negative abnormal return of −0.2% on average. Since the mean market capitalization of the companies in our sample is just over eleven billion dollars (Table 1), this abnormal return implies an average loss of more than 22 million. Naturally, abnormal returns are a very rough measure, more representative of market sentiment than a very accurate assessment of losses. However, the estimate seems to be in the right ball park, considering that the average movie in our sample brought in more than 30 million dollars in U.S. box office revenues alone. Total revenues (which include foreign markets and the DVD and video markets) for most films are usually two to three times as high (Goetzmann et al. 2009). Overall, our estimated effect ranges between 0% and 0.2% (which, as discussed, is about 22 million dollars on average) and is of a similar magnitude to existing estimates of the impact of star announcements (Elberse 2007). We note

[7] Cowan, Arnold R., Eventus software, version 7.6 (Cowan Research LC, Ames, Iowa 2003).

[8] See Fuller et al. (2002) for a discussion of event studies with frequent events. They use market-adjusted returns as we do here. Brown and Warner (1980, 1985) show that for calculating abnormal returns over short windows, this method works as well as the more complicated methods such as market model-based abnormal returns.

Table 2 All events, one per company per day

Day (relative to event)	Number of events	Mean abnormal return (%)	Positive:negative	Z-stat
−5	302	−0.04	139:163	0.32
−4	302	0.12	139:163	0.84
−3	302	−0.10	133:169	−0.60
−2	302	−0.11	134:168	−1.10
−1	302	0.07	130:172	−0.47
0	302	−0.01	142:160	−0.10
1	302	−0.20	115:187	−2.21**
2	302	−0.08	145:157	−0.33
3	302	−0.17	122:180	−1.71**
4	301	−0.10	145:156	−0.68
5	301	0.13	147:154	1.47*

All events are weighted equally

The "positive:negative" column presents a simple count of the number of events with a positive/negative abnormal return

*, ** Denote statistical significance at the 10% and 5% levels, respectively, using a one-sided test

that, on average, the production cost is almost 25% of annual net profits (Table 1). This may explain the importance of individual movies to entertainment companies' valuations and support the effect that we find.[9]

Table 2 shows that abnormal returns are negative for almost all the days in the sample, and are sometimes statistically significant. In other words, the market reaction to the announcements in our sample is, on average, negative. It is hard to provide convincing evidence as to whether the market's pessimistic interpretation of changes is "correct" without observing a counterfactual. However, it is interesting to note that the average rate of return (measured as the ratio of box office revenues to production cost) of movies in our sample (who changed their opening dates) is noticeably lower than the average rate of return in non-selected samples of movies used in other studies.[10]

In what follows, we only use two or three event windows and focus on cumulative abnormal returns (CARs). Table 3 presents the results for different types of announcements, depending on the nature of the change. As noted, we only show CARs as opposed to daily abnormal returns. For example, we estimate that over the 10-day period around the event, the average abnormal returns were negative, ranging from −0.61% to −0.35%, depending on the event type. We find similar negative CARs for the two main types of announcements: those providing a new, specific release date, and those without a specific new release date. This is somewhat surprising. One could have speculated that providing a specific date would be more reassuring to the market than a non-specific announcement. This does not seem to be the case. We also divided the sample into cases where a release

[9] The median is lower (see Table 1) since movie budgets and revenues are highly skewed, but it is still around 2.5% of net profits.

[10] As in Ravid (1999), Einav (2007), Palia et al. (2008), Goetzmann et al. (2009), and John et al. (2009).

Table 3 Cumulative abnormal return, by type of event

Event window	Number of events	Mean cumulative abnormal return (%)	Percision weighted cumulative abnormal return (%)	Positive:negative	Z-stat
Changes to a non-specific new release date					
(−1,+1)	167	0.20	0.00	74:93	0.03
(−2,+2)	167	−0.15	−0.33	81:86	−0.92
(−5,+5)	167	−0.61	−0.93	67:100	−1.74**
Changes to a specific new release date					
(−1,+1)	135	−0.09	−0.13	56:79	−0.73
(−2,+2)	135	−0.56	−0.69	53:82	−1.79**
(−5,+5)	135	−0.35	−0.07	68:67	−0.13

The "positive:negative" column presents a simple count of the number of events with a positive/negative abnormal return

*, ** Denote statistical significance at the 10% and 5% levels, respectively, using a one-sided test

was moved earlier and cases where a release was pushed later, on the assumption that the latter cases are more likely to indicate problems (production delays, budget problems, etc.). However, we did not find systematic differences between the market reactions to these two types of announcements. This evidence is consistent with the interpretation that the market was skeptical of the schedule changes under study, with shareholders interpreting the information as bad news. Given these findings, one may wonder why studios do not wait longer until they are more confident about their opening dates. However, making plans earlier has other benefits. For example, it helps in the advertising campaign, in securing the availability of screens, and in strategically scaring other studios from releasing competing movies on similar dates.

Table 4 reports regressions of the cumulative abnormal returns on the production costs of the movie, movies' box office revenues, and other control variables. The regressions use a sample of 263 movies for which we could obtain financial variables (out of the 302 movies used earlier). As might be expected, the table shows that the (negative) reaction of the market is greater for larger budget movies. Interestingly, the market reaction is not significantly correlated with the subsequent box office revenues of the movie. This may suggest a limited ability of the market to predict the success of the movie, beyond the observed productions costs. That is, it may indicate that the market is mostly concerned with cost overruns rather than with hard-to-forecast box office results.

4 Summary

We present two empirical findings. First, the market response to announcements about any changes in opening dates of movies is, on average, negative, suggesting that changes in plans are interpreted by the market as bad news. This is consistent

Table 4 The effect of movie characteristics on cumulative abnormal return

	(1)	(2)	(3)	(4)
Log (production cost)	−1.077*		−1.361**	−1.296**
	(0.551)		(0.624)	(0.643)
Log (box office revenues)		−0.018	0.373	0.319
		(0.342)	(0.384)	(0.390)
Genre fixed effects	No	No	No	Yes
MPAA rating fixed effects	No	No	No	Yes
No. of obs.	263	263	263	263
R^2	0.014	0.000	0.018	0.029

In all regressions, the dependent variable is the cumulative abnormal return in the (−5,+5) window around the event. Standard errors in parentheses

As may be expected, results for shorter windows—(−1,+1) and (−2,+2)—are noisier and largely insignificant, which is why we report results and focus our discussion on the (−5,+5) window analysis

*, ** Denote statistical significance at the 10% and 5%, respectively

with a large literature in finance which suggests that the market is skeptical of changes and re-statements, even if they can be interpreted in a positive light. Second, we find that the magnitude of the stock market response to such announcements is significantly associated with the movie's production costs but not with the movie's subsequent box office revenues. This may indicate a limited ability of the market to predict future success of movies and suggests that cost-side risks—which may be easier to forecast—are priced into the market reaction. Our findings may also reflect the importance of long-term release strategies by studios, rather than frequent schedule adjustments, and perhaps that opaque movie accounting causes the market to be skeptical of any announced changes.

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