Accounting Returns, Investment Decisions, and the Movie Industry

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We empirically examine how managers make capital project choices in the movie industry within the context of several hypotheses suggested by extant theoretical research in accounting and finance. If value or profit maximization is the ultimate motive for the manager, managers choose projects with competitive advantage as such projects would enhance a firm's returns. On the other hand, agency theories prescribe that managers may choose projects for a variety of private benefits arising from career and other concerns. Our analysis of a large sample of project-level data in the movie industry is consistent with a competitive equilibrium wherein a meaningful determinant of project choice is the trade-off between private benefits and commercial success.

1. Introduction

Extant theories in finance prescribe that in the absence of capital constraints, managers acting in the interest of a firm's shareholders should accept capital projects with a positive net present value. Similarly, theories in accounting recommend that managers should accept projects with accounting returns (revenues divided by costs) greater than zero. Empirical studies on ex-post returns for capital projects, however, are very limited and largely restricted to projects at the firm-level as data are typically only available at the aggregate-level for the entire portfolio of the firm's projects, rather than a *specific* project. In this paper, we examine project-specific empirical evidence on capital projects by looking at project choice in the movie industry.

Our motivation for examining investment decisions in the movie industry is that we are able to obtain rich project-by-project data for projects in this industry. Furthermore, our interest in the use of the movie industry as a useful laboratory for testing theories of project choice follows the increased attention to the movie industry by scholars in a variety of disciplines—probably because of the entry of hedge funds as co-financing partners in the movie picture industry. The popular press has been replete with references to this interest (see, for example, Holson 2006 and Kelly 2006).

Our selection of the movie projects we choose to examine in our study is guided by the growing scholarly attention to movie ratings given by the Motion Picture Association of America (MPAA) to assist parents in making decisions about the appropriateness of a given movie. The major categories given by the MPAA are: G,

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for General Admission; PG, used when parental guidance is suggested; PG13, used for films in which parents are strongly cautioned that some material may be inappropriate for children; and R, which restricts admission for viewers under 17 without a parent or guardian. Although G- or PG-rated movies cater to large family audiences, scholars have noted that the movie industry makes far more R-rated and PG13-rated movies (see, for example, De Vany and Walls 2002). In our investigation we complement research done on R-rated movies by examining PG13-rated movie projects and compare these to movie projects that are G- or PG rated. Although not made as frequently as R-rated movies, the number of PG13-rated movies made by the movie industry is almost twice that of G or PG-rated movies. Our analysis of PG13-rated projects further contributes to our understanding of managerial motives in project choice.

The rest of the paper proceeds as follows. In section 2, we review the literature and develop our hypotheses. Section 3 describes the methods used for our analysis. Section 4 reports our results including a discussion of the prestige gained from movie projects and a multivariate analysis of the performance of these projects. Section 5 offers a conclusion.

2. Literature Review and Hypothesis Development

Since the seminal work on agency problems by Jensen & Meckling (1976), an extensive body of literature has documented the agency conflicts arising from the separation of ownership and control. Extant theoretical research on agency conflicts suggests two possible managerial motives for choosing a particular project. If value or profit maximization is the ultimate motive for the manager, managers choose projects with competitive advantage as such projects would enhance a firm's returns. On the other hand, managers may have motives different from value or profit maximization; such managers may choose projects for a variety of private benefits arising from career and other concerns.

A large number of empirical studies have examined the above theoretical predictions by investigating the effect of changes in investment policy on stock prices of announcing firms. In the last decade, many of these studies have examined these changes by looking at stock-price responses to capital expenditure announcements in countries all over the world. Brailsford & Yeoh (2004) examined 170 capital expenditure announcements made by companies in Australia between 1995 and 1997 and find that these announcements are associated with positive stock-price responses. Jones & Danbolt (2005) investigated 88 product and market diversification capital expenditure announcements by companies in the UK between 1991 and 1996 and find that these announcements are associated with significant abnormal returns of 1.1 percent. Akbar, Ali Shah & Saadi (2008) confirm these findings for firms in the UK using a larger sample of 884 capital expenditure announcements made from 1990 to 2003. Chen (2006) investigated 246 capital expenditure announcements made between 1989 and1999 by companies listed on major exchanges in the US and finds that these announcements are associated with

significant positive abnormal returns. Chen (2008) validates these findings using a larger sample of 794 capital expenditure announcements made from 1989 to 1999. Ling & Shaikh (2011) examined 43 capital expenditure announcements made from 1998 to 2010 by Malaysian firms and find that these announcements are associated with positive abnormal returns just before the announcement. Finally, stock-price responses to capital expenditure announcements have been examined in other countries such as Spain (Del-brio, Perote & Pindado 2003) and Korea (Kim et al. 2005).

Overall, the above studies provide evidence that capital expenditure announcements made by firms in countries all over the world are, on average, received favourably by market participants. A common denominator with all these studies, however, is that they largely provide ex-ante or expected evidence on the outcomes of investment decisions. Empirical evidence on actual outcomes or ex-post returns, when available, has largely been confined to the firm-level as data are typically only available at the firm-level for the entire portfolio of the firm's projects. In this paper, we are able to determine ex-post returns for projects in the movie industry because of the rich project-by-project data available for this industry.

Based on the extant theoretical literature, we develop three hypotheses for firms making a choice between whether to make a PG13-rated versus a G- or PG-rated movie project. First, PG13-rated projects may cater to the needs of an audience population that is significantly large enough to generate more competitive advantage to the firm that makes a PG13-rated rather than a G- or PG-rated movie project. If value or profit maximization is the ultimate motive for the manager, a PG13-rated, rather than a G- or PG-rated, movie project would be chosen by the manager because of higher returns. We call this hypothesis the S*hareholder-Interest Hypothesis.*

On the other hand, managers may have motives different from value or profit maximization with the movie projects they choose to make. Such managers may choose to make PG13-rated projects for a variety of private benefits. For example, managers may be attracted to the creative complexity offered by PG13-rated projects and choose to make such projects because of the prestige that making such projects offers. In addition, managers may choose to make PG13-rated projects because they feel that PG13-rated projects are less risky as documented for some types of R-rated projects by Ravid & Basuroy (2004). Given the extreme uncertainty in the movie industry (De Vany & Walls 2002) and the absence of managerial job security (Weinstein 1998), Ravid & Basuroy (2004) argue that many decisions regarding project choice in the movie industry are essentially an end result of risk minimization to enhance job security. If so, still another private benefit that managers may attempt to extract from their project choice decisions is job security from risk minimization. To the extent that project choice by managers is motivated by desires to extract private benefits such as prestige or job security, PG13-rated projects would be associated with lower returns than G- or PG-rated projects. We label this hypothesis the *Management-Interest Hypothesis.*

Finally, we note that competitive equilibrium asserts that the returns from PG13-rated projects should not be significantly different from those for G- or PG-rated movie projects. If PG13-rated projects produced systematically lower returns than those for G- or PG-rated movie projects, we would expect PG13-rated projects would not continue to exist in the marketplace. If, on the other hand, PG13-rated projects produced systematically higher returns than G- or PG-rated projects, and an unlimited supply of scripts for PG13-rated movies was always available, we would expect all movie projects to be PG13-rated projects. That PG13-rated projects manage to survive, and that not all movie projects are PG13-rated projects, suggests that PG13-rated projects are associated with returns that are not significantly different from those for G- or PG-rated projects. We label this hypothesis the *Competitive Equilibrium Hypothesis*.

3. Methods

Our sample of movie projects includes all PG13-, G-, and PG-rated, narrative English-language feature films that were released in theaters in North America from 1992 to 2007. We exclude documentaries and foreign-language movies to make the attributes of the movies in our sample more similar. Also, we exclude movies that were not released on at least 100 screens during their theatrical run, because such movies tend to be classified as art-house movies that are best modelled separately.

We classify our data into two subsamples: one containing only PG13-rated movies and the other containing G- and PG-rated movies. For each of the movies in our PG13-rated subsample, we read the reasons given by the MPAA why a particular movie was given a PG13 rating and then conducted a content analysis of these reasons. To compare our results with Ravid & Basuroy's (2004) results for R-rated movies, we first coded the movies given a PG13 rating into categories for 'violence,' 'sex' and both 'violence and sex.' We also gathered data on the remaining categories of reasons including 'language,' 'drugs/alcohol,' 'sexual/crude humor,' 'theme,' and 'other.' Following Leone & Osborn (2004) we next coded each PG13-rated movie based on indicators of the *amount* and *intensity* of its adult content for each category discussed in the reasons for the rating. Specifically, for the amount of adult content indicator, we used the following ordinal scale: 1 (*least amount*) for words such as *brief*, *a scene*, and *momentary;* 2 for words such as *sequences of*, *scenes*, and *some;* 3 when there was no time indicator; and 4 (*most amount*) for words such as *sustained, frequent, pervasive*, and *non-stop.* Similarly, for the intensity indicator we used the following ordinal scale: 1 (*least intense*) for words such *mild;* 2 when there was no intensity indicator; and 3 (*most intense*) when words such as *intense, strong, extreme, brutal, bloody* and *graphic.* The amount and intensity indicators were then multiplied for each category and then added to arrive at an adult content score variable that took into account both the amount as well as the degree of adult content for each movie in the PG13-rated subsample.

For each movie project in both the PG13- and the G- or PG-rated subsamples, we obtain data items from well-known suppliers of data for the movie industry, including

Baseline/Filmtracker and its partner *Kagan LLC*, *Variety*, *IMDB* and *Box Office Mojo*. Also, for each movie, we manually collect additional pieces of data to identity unique characteristics of each project. Collectively, our dataset includes data items that provide proxies for estimating the performance, private benefits and control variables described below.

We measure performance using the project's global return, which we calculate by dividing revenues by costs in both domestic and foreign markets. We use two variables related to private benefits, one for prestige and the other for job security from risk minimization. As a measure for prestige, we use major awards (Best Picture, Best Actor, Best Actress, and Best Director) given by the Academy of Motion Picture Arts and Sciences (widely regarded as the most well-known peer group that gives awards) as well as awards given by other renowned peer juries. Specifically we looked at the Academy Awards, the Directors Guild Awards, the Golden Laurel Awards and the Independent Spirit Awards. To construct a variable for job security from risk minimization we conduct a close examination of the returns for all movies in our sample, following Ravid & Basuroy's (2004) examination of this issue with R-rated movies. First, we examine the variance of the returns for the PG13-rated projects in our sample and compare this to the variance for G- or PG-rated projects. Second, we investigate whether PG13-rated projects break even more often than G- or PG-rated projects. Finally, we examine the distribution of the returns to gain insights into whether PG13-rated projects are more likely to be flops because, as Ravid and Basuroy (2004) note, it is only with major flops that managers lose their jobs.

Hadida (2009) provides an extensive list of the determinants of commercial success in the movie industry and we use many of these determinants as control variables in our regressions discussed in the next section. Specifically, we use variables for star and director power, a genre dummy, budget, a sequel dummy, the maximum number of screens on which a movie is released, a season dummy and a numerical variable for the composite critical reviews of the movie. To identify powerful stars and directors in the movies in our sample, our main sources are *James Ulmer's* lists of A and A+ stars as well as A and A+ directors. The genre dummy takes on a value of one for genres more likely to have a larger audience when *Baseline/Filmtracker*, our source for genres, classifies the genre as action, sci-fi, horror, thriller, animation, or family and zero if the genre is a comedy, drama or romance. The season dummy takes on a value of unity if a movie in our sample was released in theatres in North America during the Christmas/Summer season, and zero otherwise. Finally, the composite critical review variable is constructed using the average score of three widely-known movie guides: *Leonard Maltin's Movie and Video Guide*, *TV Guide*, and *Videohound's Golden Movie Retriever*.

4. Results and Discussion

Descriptive statistics of the movie projects in our sample are presented in Table 1. In order to preserve comparability, the numbers for budget, total revenues and returns

were adjusted for inflation. The means and medians of various variables described in this table are similar to those in previous studies. The sample contains 982 (64 percent) PG13-rated and 554 (36.8 percent) G- or PG-rated movie projects. Thus the majority of the projects in our sample are PG13-rated projects.

Table 1
Summary Statistics

Variable	Mean	Median
PG13-Rated	0.64	1
Star Power	0.22	0
Director Power	0.07	0
Composite Critical Reviews	57.40	58.33
Maximum Screens	2,084.67	2,144
Season	0.53	1
Genre	0.37	0
Budget ($ millions)	47.26	34.58
Total Revenues ($ millions)	111.44	58.86

To test the hypotheses described in Section 2, we first evaluate various risk characteristics of the movie projects in our sample. Ferrari & Rudd (2008) note that "with studios able to only take a few bets per year, and executives justifiably worried that one wrong decision will end a career, the opportunities for learning are restricted and the incentives to sacrifice return for comfort are strong." To gain insights into whether there are any meaningful differences between the risks of the movies in our sample, we first calculate the variance of returns. Our results indicate that the variance for PG13-rated projects is significantly less than that for G- or PG-rated movie projects.

Following Ravid & Basuroy (2004), we also examine whether PG13-rated projects are more likely to break even than G- or PG-rated movie projects. Our tests indicate that 47.56 percent of the PG-13 rated movies in our sample break even as compared to 56.14 percent of the movies G- or PG-rated movies. The difference between these percentages is statistically significant. Thus our results indicate that PG13-rated projects are less likely to break even than G- or PG-rated movie projects. Finally, we examine the distribution of returns for PG13-rated projects and G- or PG-rated movie projects using industry heuristics such as a return less than 0.5 represents a "flop." Our tests indicate that 22.61 percent of the PG-13 rated movies in our sample flop as compared to 18.05 percent of the movies G- or PG-rated movies. The difference between these percentages is statistically significant. These results show that PG13-rated movies are more likely to flop than G- or PG-rated movies. Collectively, these results do not provide evidence that mangers choose PG13-rated projects for risk minimization for job security, as predicted by the *Management-Interest Hypothesis.*

Table 2
Comparison of risk characteristics for PG13-rated vs. G- or PG-rated movies

	PG13-rated movies (1)	G- or PG-rated movies (2)	p-value for the difference between (1) and (2)
Number	982	554	
Variance of the rate of return	1.20	1.99	0.020
Percentage that break even (rate of return ≥ 1)	47.56	56.14	0.001
Percentages with various rate of return values			
3.00 and higher	6.31	10.29	0.005
1.70 to 2.99	17.11	20.40	0.109
1.00 to 1.69	24.13	25.45	0.565
0.50 to 0.99	29.84	25.81	0.093
0.01 to 0.49	22.61	18.05	0.035

We use analysis of variance to compare differences in variances and the Pearson's chi-squared test to compare differences in percentages. All reported p-values are for two-tailed tests.

As discussed previously, Ravid & Basuroy (2004) distinguish between R-rated movies as violent, very violent, containing sexual content and both sexual as well as violent content. Their results show that whereas very violent movies as well as movies with sex and violence do not decrease returns, they do decrease risk. To examine the role of violence and sex in risk reduction for PG13-rated movies, we repeat the tests described in Table 2 for sub-classes of movies with violence, sex and both sex as well as violence and report our findings in Table 3. Panel A compares the variances of sub-classes for PG-13 movies with violence, sex, and both sex as well as violence with all other PG-13 movies and also with all G- or PG-rated movies. None of differences between these subsamples are statistically significant. Panel B compares the percentages of movies that break even for sub-classes for PG-13 movies with violence, sex, and both sex as well as violence with all other PG-13 movies and also with all G- or PG-rated movies. Once again, p-values for the differences between these subsamples indicate that most of the differences between these percentages are statistically insignificant. Similar results are documented in Panel C that compares the distribution of returns for sub-classes for PG-13 movies with violence, sex, and both sex as well as violence with all other PG-13 movies and also with all G- or PG-rated movies. Overall these findings show that none of the

Table 3
Comparisons of the risk characteristics for various subsamples of PG13-rated movies with other movies

PG13-Rated Subsample		Movies in PG13-rated subsample (1)	All other PG13-rated movies (2)	All G- or PG-rated movies (3)	p-value for the difference between (1) and (2)	p-value for the difference between (1) and (3)
Panel A: Comparisons of variances of rate of return						
Violence	Variance	1.30	1.13	1.99	0.614	0.123
	Number	391	591	554		
Sex	Variance	1.19	1.21	1.99	0.972	0.104
	Number	430	552	554		
Violence & Sex	Variance	0.99	1.25	1.99	0.514	0.117
	Number	180	802	554		
Panel B: Comparisons of percentages of movies that break even (rate of return ≥ 1)						
Violence	Percentage	50.64	45.52	56.14	0.116	0.095
	Number	391	591	554		
Sex	Percentage	48.37	46.92	56.14	0.651	0.016
	Number	430	552	554		
Violence & Sex	Percentage	50.56	46.88	56.14	0.373	0.191
	Number	180	802	554		
Panel C: Comparisons of percentages for various rate of return groupings						
Violence	≥3.00	7.42	5.58	10.29	0.248	0.131
	1.70 to 2.99	17.65	16.75	20.40	0.715	0.291
	1.00 to 1.69	25.58	23.18	25.45	0.391	0.966
	0.50 to 0.99	29.92	29.78	25.81	0.962	0.163
	0.01 to 0.49	19.44	24.70	18.05	0.053	0.590
Sex	≥3.00	4.88	7.43	10.29	0.104	0.002
	1.70 to 2.99	16.05	17.93	20.40	0.436	0.081
	1.00 to 1.69	27.44	21.56	25.45	0.033	0.482
	0.50 to 0.99	31.63	28.44	25.81	0.279	0.045
	0.01 to 0.49	20.00	24.64	18.05	0.085	0.439
Violence & Sex	≥3.00	4.44	6.73	10.29	0.254	0.017
	1.70 to 2.99	16.11	17.33	20.40	0.694	0.206
	1.00 to 1.69	30.00	22.82	25.45	0.042	0.230
	0.50 to 0.99	32.22	29.30	25.81	0.439	0.094
	0.01 to 0.49	17.22	23.82	18.05	0.056	0.801

We use analysis of variance to compare differences in variances and Pearson's chi-squared test to compare differences in percentages. All reported p-values are for two-tailed tests.

violence, sex and both sex as well as violence sub-classes reduce risk in our sample perhaps because the extent of violence and sex in PG13-rated movies is quite different from that in R-rated movies.

To investigate the role that varying levels of adult content can play in risk reduction, we repeat the tests described in Table 2 for four categories of sub-classes having the following adult content indicators: 0 to 6, 7 to 11, 12 to 15, and 16 to 36. In unreported tests, we are once again unable to find any consistent patterns in risk reduction that depend on the extent of the adult content in the movies in our PG13-rated subsample.

Table 4 compares the major awards (Best Picture, Best Actor, Best Actress, and Best Director) received by PG13-rated projects with those received by G- or PG-rated projects movie projects. In the first two rows of Table 4, we examine award nominations by investigating the percentage of movies that received at least one nomination and also by checking the mean number of awards received. In both cases we note that there is a substantial difference between award nominations, conditional on whether the movie is a PG13-rated versus a G- or PG-rated project. In the next two rows we examine this difference by now looking at movies that won awards. Once again, the difference between PG13-rated and G- or PG-rated movie projects is substantial and statistically significant. Collectively, our results on awards suggest that there is significantly more prestige to be gained from making PG13-rated rather than G- or PG-rated project, irrespective of whether we examine award nominations or wins. This result is consistent with the *Management-Interest Hypothesis.*

Table 4
Comparison of awards for PG13-rated vs G- or PG-rated movies

	PG13-rated movies (1)	G- or PG-rated movies (2)	p-value for the difference between (1) and (2)
N	982	554	
Percentage with at least one major award nomination	6.01	3.25	0.017
Mean number of major award nominations	0.14	0.08	0.043
Percentage with at least one major award win	1.93	0.54	0.027
Mean number of major award wins	0.04	0.01	0.001

We use the Pearson's chi-squared test to compare differences in percentages and t-tests to compare differences in means. All reported p-values are for two-tailed tests.

Table 5 presents the results of our regressions. Whereas the signs of the control variables are similar to those in previous studies, the PG13-rated dummy remains insignificant in all four regressions. On the whole, these results indicate that the performance of PG13-rated projects is not better or worse than G- or PG-rated movie projects. This result is not consistent with the M*anagement-Interest* or *Shareholder-Interest Hypothesis.* It is, however, consistent with the *Competitive Equilibrium Hypothesis,* according to which the returns from PG13-rated projects should not be significantly different from those for G- or PG-rated movie projects.

Table 5
Determinants of rate of return regressions

Dependable Variable	Rate of return	Log of rate of return
Intercept	-1.389	-0.983
	(0.000)	(0.000)
PG13-Rated	-0.077	-0.016
	(0.202)	(0.314)
Sequel	0.271	0.088
	(0.002)	(0.000)
Star Power	-0.012	0.003
	(0.873)	(0.871)
Director Power	0.278	0.048
	(0.024)	(0.087)
Composite Critical Reviews	0.033	0.011
	(0.000)	(0.000)
Maximum Screens	0.0005	0.0002
	(0.000)	(0.000)
Season	0.234	0.060
	(0.000)	(0.000)
Budget	-0.007	-0.003
	(0.000)	(0.000)
Genre	0.108	0.008
	(0.082)	(0.628)
N	1,536	1,536
Adjusted R^2	0.26	0.39
F-value	60.75	108.64

This table reports the estimated coefficients from OLS regression analysis. P-values are reported in parenthesis. Results are corrected for heteroskedasticity using the White (1980) correction.

5. Conclusions

Although a considerable body of theoretical research has evolved on project-specific theories on investment policy decisions, empirical evidence on these decisions remains justifiably restricted to the firm-level as data are usually only available at the aggregate-level for the entire portfolio of the firm's projects. In this paper, we investigated project-specific empirical evidence on investment policy by looking at the movie industry. Specifically we looked at PG13-rated projects and compared them to G- or PG-rated projects.

We examined movie projects in our sample within the context of extant theoretical research that suggests several hypotheses to explain managerial motives for choosing a particular project. The *Management-Interest Hypothesis* assumes that managers choose projects that maximize their private benefits such as prestige or job

security from risk minimization. The *Shareholder-Interest Hypothesis* is based on value or profit maximization being the ultimate motive for the manager. Our analysis of PG13-rated projects indicated that these projects provide managers with substantial private benefits from prestige but not risk minimization. We also found that the ex-post returns from PG13-rated projects are not significantly different from those from G- or PG-rated projects. These results are consistent with the *Competitive Equilibrium Hypothesis* in which a meaningful determinant of project choice is the trade-off between private benefits from prestige and commercial success. While our work highlights the role of managerial motives in project choice, an important limitation of our study must be noted. Given that our findings are based on projects in the movie industry, any applications to other industry must be made with caution.

Acknowledgements

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