Creativity and project value in the film industry

Jialan Wang
Massachusetts Institute of Technology
jialanw@mit.edu

January 15, 2007

Abstract

As creative workers become an increasingly important part of the economy, the need to understand their impact on the behavior and organization of firms grows ever more urgent. In particular, managing creative human capital requires a balance between giving workers creative freedom and channelling their creativity toward work germane to the firm's goals. This project aims to explore this trade-off by examining the relationship between art and commerce in the film industry. Using data for films released between 1980 and 2005, I provide evidence that artistic films are more likely to have characteristics negatively correlated with financial performance; in addition, they perform worse than commercial films even after controlling for these characteristics. Yet, artistic films continue to be produced, and all of the major studios have specialty-film divisions devoted to producing them. Although this behavior may ostensibly seem inefficient, I find that artistic films benefit studios by attracting valuable stars who derive utility from working on artistic films and by increasing their productivity. Stars are more likely to work with a studio in future films after working on an artistic film, and these subsequent films tend to perform better than other films with similar characteristics. Thus, while artistic projects may not seem profitable when considered in isolation, they may enhance the value of a studio's film portfolio by increasing the productivity of stars and by increasing the likelihood of

retaining them for future films. These results suggest that in human-capital-intensive firms, project value must be evaluated with consideration for human-capital-driven interactions, and they also suggest a possible role for using projects as perks for creative workers.

1 Introduction

In recent years, many commentators have noted a paradigm shift in the labor market of developed economies of from the manufacturing sector toward service and professional occupations. As a result, the competitive advantage of countries like the U.S. increasingly relies on the the ingenuity of human capital to drive productivity and innovation. As Luigi Zingales asserted in his 2000 article "In Search of New Foundations," this dramatic shift in the nature of firms and the workforce necessitates new approaches to corporate finance. In this paper, I focus on a few key aspects of the new type of firm - the creativity of human capital and costs and benefits creative freedom.

Creative workers are distinguished both by the nature of their work and by the characteristics of the people who are drawn to and succeed at creative work. Whereas workers in a manufacturing-based economy perform mainly standardized, repetitive tasks which required little creative input, the most valuable employees in the new economy - whom economist Richard Florida deemed the "creative class" [1] - are both highly skilled and highly specialized, and their output reflects their unique combination of skills. As Florida puts it,

> ... the key difference between creative workers and other workers lies in what they are primarily paid to do. Those in the Working Class and the Service Class are primarily paid to execute according to plan, while those in the Creative Class are primarily paid to create.[Florida, 2002, p. 8]

By Florida's estimation, creative workers make about 30% of the workforce. They include "core" creative workers such as scientists, artists, and writers as well as professionals such as lawyers, doctors, and executives. While creative workers are defined by the open-ended nature of their work, they also differ from other workers in the economy in other ways. In particular, creative workers seem to have very different motivations than the workers

[1] See Florida [2002]

of our standard economic models. One key difference is that creative workers tend to place priority on the creative satisfaction they derive from their work and are only secondarily concerned with monetary compensation [2].

Florida and others present convincing evidence that creative workers are willing to give up substantial monetary rewards to pursue their creative interests [3]. In a deeper sense, the drive to pursue the ideas which most inspire them (as opposed to those which are most popular or most lucrative) is what makes creative workers effective at coming up with good ideas in the first place [4].

Thus, while the standard principal-agent problem of motivating workers to exert effort may be relevant for workers who perform routine tasks, creative workers generally do not need incentives to contribute effort. Instead, firms with creative workers face the challenge of chanelling their efforts toward ideas which serve the firm's goals, which may not correspond to their own creative visions. However, a key distinction between creative satisfaction and other private costs and benefits [5] from which employees may derive utility is the intrinsic link between a person's creative satisfaction and her ability to generate ideas. Thus, creative freedom is related to perks which improve a worker's productivity [6]. Furthermore, while routine tasks mainly require effort, creative tasks require inspiration. Although effort can often be induced through monetary incentives, the work of generating ideas is largely beyond the control of workers, so even if they wanted to, they may not be able to respond to these incentives. Thus, firms face many sources of conflict between their financial goals and the creative goals of employees.

In particular, the payoffs to granting creative freedom are unclear. If too little freedom is granted, then the innovativeness of employees may suffer. If too much freedom is granted, employees may pursue projects with poor financial returns. The right amount of creative freedom depends on the correlation between employees' creative objectives and the financial objec-

[2]See Drucker [1998] and Drucker [1999] and Florida [2002, p. 86-88]

[3]See Chapter 5 of Florida [2002] and sources cited within

[4]See Dubner and Levitt [May 7, 2006] and Ericsson [2006], who show that the most productive workers are not necessarily those who are most talented, but those who are most passionate about what they do.

[5]These include the cost of effort, perquisites, and other non-pecuniary aspects of a worker's utility function.

[6]Examples from Rajan and Wulf [2006] include corporate jets that save travel time for executives and complementary food and beverages which cut down on employee time spent away from the office.

tives of the firm and on how much their creative ability depends on freedom. Intuitively, the optimal amount of freedom should be greater if employees tend to pursue profitable projects when given more freedom or if employee ability depends more on having creative freedom. One example of a firm which gives a large amount of creative freedom is Google, which has a policy of allowing workers to spend 20% of their time on projects unrelated to their primary assignments, and reportedly, some of the company's successful commercial ventures were developed in employees' "free time". This type of policy may also provide indirect benefits by increasing the productivity of creative workers, and helping to recruit and retain talent.

To that workers enjoy creative freedom, projects for which they are given control may act as perks for creative employees. While previous studies such as Rajan and Wulf [2006] have explored the potentially value-enhancing role of perks, this paper aims to go further by examining creativity as a channel through which perks may boost employee productivity. By nature, firms may be better-positioned to provide employees with the chance to exercise their creativity than employees themselves [7]. Thus, the value of projects which allow employees creative freedom must be evaluated with consideration their role as perquisites and their impact on the value of human capital.

2 The Film Industry

The film industry presents many advantages for studying the role of creative human capital. Creativity is clearly central to the film production process, since each film is a unique product which has no general blueprint and requires the daily creative input of the cast and crew in order to be completed. The industry serves as a model of an economy in which much of firms' value depends on human capital, but human capital is also extremely mobile, so firms must continuously compete to attract talented workers. As Thomas Malone wrote [Malone, 2004, p. 154],

> The business of making movies provides a prototype of the kind of knowledge- and creativity-intensive work that is likely to characterize many industries in the future

[7] A scientist working at a pharmaceutical firm for example, would have a hard time exercising his bio-chemical creativity in his garage, whereas the firm he works for has all of the necessary equipment and resources to engage his creativity.

Employee turnover is increasing especially quickly in human-capital-intensive industries, so studying the film industry may provide valuable insights for the emerging economic landscape in which firms must compete to attract the most talented workers. Lastly, since all completed film projects are publicly released, the film industry allows us to examine the interactions between firms and creative human capital in detail .

Films are inherently risky projects, so stars are generally regarded as valuable assets which reduce the risk and increase the expected profits of film projects. De Vany and Walls [2002b] present evidence of the risky nature of the film industry: most films make very little profit and a few films each year make huge profits. To cope with these risks, the industry is organized into several large studios [8] which generate the bulk of industry profits as well as a multitude of much smaller studios, many of which only make a few films before petering out. The highly unpredictable nature of film revenues puts large studios at an advantage over smaller ones, as they can use their greater capital base to reduce the risk of individual films. De Vany and Walls [1999] show that studios can also use bigger budgets, bigger openings, and other investments to reduce downside revenue risk. With between 10-20 films per year, the large studios can also mitigate the risks of individual films through diversification [9].

In this study, I focus on the economic role of stars. The broad consensus among previous studies [10] is that only a handful of actors and directors (whom I will collectively term "stars") have the ability to consistently improve film performance. Moreover, while stars do seem to improve the revenues and risk characteristics of films, they do not seem to improve returns or add value beyond the rents that they capture[11]. In a series of papers, De Vany and Walls examine stars with respect to the distributions of film outcomes [12]. They show that although stars are no guarantee of success, a few top stars are able to increase the probability that a film will become a hit, thus reducing risk. Moreover, De Vany and Walls [1999] identify about 20 top

[8] There were seven major studios until the merger of MGM with Sony in 2005 reduced the number to six.

[9] See Gertner [November 12, 2006]

[10] See John et al. [2002], Ravid [1999], De Vany and Walls [1999, 2002b] and Elseberse [2006], among others

[11] A notable exception is John et al. [2002], who find that star directors have a positive and significant impact on film returns.

[12] See De Vany and Walls [2002b, 1999, 2002a]

stars who have positive and significant impact on the probability of film success and on film profitability. Elseberse [2006] uses data from online market simulations to show that announcements of star involvement in films increases expected theatrical revenues. However, she finds that stars do not increase the valuation of movie studios, suggesting that stars capture the rents that they generate.

While most of these studies have focused on relatively recent films, it was not always the case that stars were able to capture their full value-added. Under the so-called "star system" which was in place during the early days of Hollywood, stars were essentially long-term employees for the studios and were obliged to work exclusively with one studio [13]. However, with the demise of the star system in the 1940s and the rise in the power of talent agencies and the stars they represent, studios must now compete to attract these valuable stars for their projects. Nowadays, stars are essentially free agents who work for the studios on a project-by-project basis, although longer-term contracts are also employed. Thus, the superior bargaining position of stars in the current industry environment lends credence to the rent capture hypothesis.

Another salient characteristic of the film industry which makes it a good subject for this study is that the creative workers involved in filmmaking clearly care about the artistic merit of their work as a dimension independent of their compensation and the profitability of their films. In fact, stars may even eschew films which are too commercial and lack strong creative impetus, and their reluctance to star in commercial films may be one reason for their extraordinarily high salaries. As legendary Hollywood screenwriter William Goldman puts it, "movie stars, by and large, do not want to appear in commercial films" (Goldman [2000, p. 193]). Stars' appetite for artistic satisfaction can be verified in several ways. To begin with, actors and directors receive very little compensation on average. As reported by the Bureau of Labor Statistics, the average member of the guilde makes less than $ 5000 per year in acting fees. Many stars work for years as unknowns before they break into high-paying films, so unless they grossly overestimate the probability of attaining stardom, we may presume that they gain some intrinsic utility from their creative work. Moreover, many stars choose to work on artistic films for much less than their market salary even when they're able to command multi-million dollar salaries for commercial films. A recent example is George Clooney. While he reportedly earns up to $20 million per

[13] Although studios sometimes leased to each other the right to use stars.

film [14], in recent years he's done two artistic films for a fraction of his normal salary (*Oh, Brother Where Art Thou* and *Syriana* for $500,000 each) and two for no pay at all (*Confessions of a Dangerous Mind* and *Good Night, and Good Luck*). The star himself sees his commercial work as a way to gain opportunities to do work he really believes in: "I succeed in both worlds. I hope that selling out on 'Ocean's Eleven' is not such a bad deal. The trade-off is, I get to go make something uncommercial that will probably lose money"[15].

In an ideal world, the films which are most artistically satisfying would also generate the most profits, satisfying the talent as well as studio executives and shareholders. However, many commentators have noted a profound tension between art and commerce in Hollywood, and the dichotomy is often framed as a choice between studio and independent films [16]. While "studio" films are characterized as big-budget movies made by one of the seven major studios to earn as much profit as possible, "independent" films are those made outside the studio system. According to director Sydney Pollack, "Independent usually meant anything that was an alternative to recipe films or mainstream films made by studios [Biskind, 2004, p. 19])." In addition to the content they produced, "independent" film studios are also identified with the creative freedom afforded to directors by studio executives; according to a former executive of United Arists Classics (one of the artistic film divisions used in my analysis), "Once the script and the director were set and it was clear the movie could be made for the budget they wanted, then we stepped aside and let the artists do their work Biskind [2004, p. 18])." While commentators draw a strong conceptual distinction between studio and independent films, the labels as such are misnomers. Many so-called independent films are actually financed, produced or distributed by the large studios, oftentimes through subsidiaries devoted to artistic filmmaking. These specialty divisions are explicitly targeted toward artistic films and clearly distinguish themselves from their studio parents, often employing labels such as "independent", "classic" to signal their specialization.

The tension between commercial and artistic films arises because of a general perception that independent or artistic films seldom make a profit.

[14] According to the Internet Movie DataBase (IMDB), he reportedly earned $20 Million each for *Ocean's Eleven* and *Ocean's Twelve*

[15] Thompson [July 1, 2005]

[16] See [Goldman, 2000, p. 206-207] or McCabe [August 20, 2004]

According to industry expert Edward Jay Epstein[17], "Just as Exxon, Royal Dutch Shell, and British Petroleum do not make their living from oil paint ... Hollywood studios do not make money from producing (or distributing) the occasional art or social-commentary movie." In fact, film studios themselves sometimes represent their films as vehicles for artistic excellence with little profit potential. In a recent lawsuit against the makers of oscar-winning film *Brokeback Mountain*, actor Randy Quaid alleged that the film's producers falsely represented it as "a low-budget, art house film, with no prospect of making any money" in order to secure his participation at a reduced salary. If we view creative satisfaction as a private benefit for stars in a standard principal-agent framework [18], then studios would want to give control to stars only if artistic quality were positively correlated with project value. However, since artistic measures are broadly negatively correlated with financial value, it seems counter-intuitive that studios have set up specialized artistic subsidiaries which cultivate reputations for giving stars creative control of films.

The continued production of artistic films by large studios is all the more puzzling in light of recent work by Fee [2002], who shows that due to the agency problem between filmmakers with artistic aspirations and studio executives with profit motives, film producers with high artistic stakes are more likely to finance films independently. Moreover, he finds that artistic films which are financed by studios perform worse than those financed independently, possibly because filmmakers exert less effort due to their reduced control in studio-financed projects. The industry has long been patronized by wealthy investors who seem more interested in the glamour and cultural impact of artistic films [19], and the presence of these relatively financially-insensitive investors would be expected to further drive value-maximizing studios away from artistic filmmaking [20]. Thus, the presence of investors and firms which derive private benefits from making artistic films provides further disencentive for profit-motivated firms to enter this market.

The question of why studios make so many artistic films is closely related to the "R-rating puzzle" - the tendency of studios to make too many R-rated films - which has been studied by several researchers in the past. De Vany and

[17]Epstein [February 22, 2006]

[18]As in Aghion and Bolton [1992], for example

[19]A recent example is former eBay President Jeff Skoll, whose film company has recently financed such socially pertinent films as *An Inconvenient Truth* and *Syriana*

[20]Morton and Podolny [1998] have noted similar dynamics in the wine industry

Walls [2002b] present some of the most prominent evidence on this puzzle, showing that film budgets, revenues, and profits display a non-Gaussian, fat-tailed distribution, and that R-rated, "counterculture" films have both lower returns and higher risk than films rated G, PG, or PG-13 films. In contrast, Ravid and Basuroy [2004] show that movies which are very violent or which feature sex and violence may be less risky than average films, which provides some motivation for studios to produce them despite their lower revenues. While ratings are an imperfect proxy for artistic merit, casual inspection shows that artistic films are disproportionately rated R, so an explanation for why studios produce artistic films would go some ways toward explaining the R-rating puzzle.

While some may explain the preponderance of artistic films as mismanagement or irrationality on the party of Hollywood studios, it is difficult to believe that such irrationality can long persist in a business as lucrative and risky as filmmaking. Indeed, the multi-national media conglomerates which own all of the major studios are paragons of big business - not the type of firms one would imagine to engage in art for art's sake without gaining any economic benefit. Thus, given that the major studios continue to play a vital role in producing artistic films, we are obliged to consider the economic justification for these investments.

To understand why studios make artistic films, I compare film projects along commercial and artistic criteria. My analysis shows a clear tension between artistic and commercial quality in the film industry; while commercially successful films tend to have low artistic quality, films with high artistic quality tend to have low commercial value. The films which are recognized for artistic merit are likely to be smaller films with small audiences and modest profits, the most profitable films tend to be broad comedies, action adventures, and children's films. In recent years, the divide between commercial and artistic films has widened as blockbuster films have tapped into merchandizing opportunities, cross-promotion deals, and alternative financing schemes to which most artistic films do not have access. Thus, the difference in profitability between commercial and artistic films is even greater than it appears from examining film revenues alone.

Thus, although artistic films do not seem to generate enough profit to justify the frequency of their production, studios seem to find it favorable to include them in their film portfolios. While this behavior could be interpreted as an inefficient allocation of investment, I present evidence that artistic films can in fact be valuable to studios who need to attract talent from a very

small pool of top stars. Of course, the sacrifice is wasted unless stars are compelled to continue working with a studio after it grants the star access to an artistic film. There are two main channels through which a star may be induced to work with a studio again after working on an artistic film. The most direct channel is through explicit multi-film contracts between studios and stars. While contracts for multiple specific films are rare owing to the uncertainty of filmmaking and the difficulties of scheduling, options are often used whereby studios retain the right to use a star in a future film of its choosing. However, the main channel through which stars may be induced to repay studios for the chance to work on artistic films is through the relationships and social connections formed through the process of filming the initial artistic film. Because relationships and informal contracts are so critical in the film industry, artistic films give studios a valuable access to stars which allows them to nurture these social connections. Artistic projects may allow studios to form more favorable relationships with stars than commercial projects because stars are given creative freedom and thus may feel more goodwill to a studio than when working on a blockbuster which suffers creative interference from managers. While these channels generally do not bind a star to work for a studio in the future, they may significant increase the probability that she will. Thus, while artistic projects may not be profit-maximizing when evaluated individually, they may enhance the overall value of a studio's film portfolio by increasing the likelihood that popular stars will work with the studio in the future.

3 Data

3.1 Data sources

A wealth of data exists in the public domain on many different film characteristics. My primary source of data is boxofficemojo.com, a popular internet resource for data on film revenues which has been cited by the Wall Street Journal and the Los Angeles Times[21]. The database includes over 6500 films released from January 1980 to June 2005, with data on domestic and international revenues, film run times, MPAA ratings, and film distribution companies. In addition, the database includes production budgets estimated from news reports and trade publications. While domestic rev-

[21]See Lippman [June 24, 2005] and Friedman [June 6, 2006]

enues are included for all films my sample, less than half of them have data on production budgets. The films with production budget data are typically larger and more likely to be distributed by large studios, leading to potential sampling bias. However, since I focus on the difference between artistic and commercial films distributed large studios, this bias is mitigated. Moreover, since artistic films tend to be smaller and are less likely to have budget data, this bias works against my hypothesis that artistic films are less profitable. I obtained a monthly CPI series from Global Financial Database to adjust all dollar values in the dataset to December 2004 dollars. For the few films with budget data in foreign currency, costs were converted to USD using the average exchange rate for the year of release before adjusting for inflation.

Revenue and budget data are merged with data from the Internet Movie Database (IMDB), the world's largest film database. From the IMDB, I have gathered data on film genres, star filmographies, and Oscar nominations. While all films in my data set are released with a unique MPAA rating (or classified as unrated), the IMDB utilizes up to eight genre categories for a single film. Because I use Oscar nominations as a way to identify artistically oriented films, I focus on the eight award categories which most reflect artistic quality: best picture, best director, best actor, best supporting actor, best actress, best supporting actress, best original screenplay, and best adapted screenplay.

I use the Premier 100, an annual list compiled by Premiere magazine of the most powerful players in Hollywood, to identify the stars who have significant bargaining power. This list has been used to similar effect in previous studies such as De Vany and Walls [2002b]. Because many of the most powerful players in Hollywood are not stars but agents, executives, and producers, stars represent only a fraction of the Premier 100, leaving us with a small but focused universe of stars who are likely to convey substantial economic value to studios. According to my hypothesis, studios are likely to use artistic films as perks mainly for the top stars, so I restrict consideration to them. Not only might less well-known talent have little leverage with the studios, but in their quest for fame and success, they may also be more willing to put aside their artistic ambitions for the chance to star in films which reach wide audiences. The biggest stars in the industry may have enough clout to negotiate deals with studios which allow them to pursue artistic ambitions in addition garnering high salaries.

As one way of identifying artistic films, I used a list of all films which

have been shown at the Sundance Film Festival[22], which was founded by film star Robert Redford in 1985 and is the most prominent festival for artistic and independent films in the United States. By merging these data, I have been able to create a unique data set with which to examine the pattern of projects stars take on and to determine whether artistic films benefit studios by attracting stars.

3.2 Definitions of artistic films

I use three different definitions of artistic films: 1) films produced by artistic divisions of large studios 2)films nominated for oscars in one of the eight major categories 3) films exhibited at the Sundance Film Festival. Commercial films are defined as those made by one of the seven major studios, excluding those made by artistic subsidiaries.

Definition 1) is a somewhat parsimonious classification of artistic films and has the advantage of identifying filmmakers' *ex ante* intention of making artistically-oriented films. Within the seven major studios [23] are numerous divisions which specialize in different types of films or represent which labels carried over from previous acquisitions. In particular, some divisions specialize in the production and / or distribution of artistic films. Although the classification of artistic subsidiaries is subjective and based on my own judgement, these subsidiaries have been widely acknowledged in the press to focus on the development artistic films [24], and they employ identifying adjectives such as "classics" and "independent" in their names to signal their distinction from their studio parents. While most films falling under definition 1) would be considered artistic based on casual inspection, many films distributed by large studios [25] may also be considered artistic and would be misclassified.

Using Oscar nominations to define artistic films overcomes the issue of overlooking artistic films made in non-artistic divisions of studios; films distributed independently, through artistic subsidiaries, and through commercial studio divisions are all represented under this definition. Furthermore, stars derive direct benefit from Oscar nominations in addition to films' artis-

[22]The list was obtained from the Sundance Institute via email

[23]See Appendix A for a list of the studios and subsidiaries

[24]See Biskind [2004] for a detailed account of the rise of artistic subsidiaries, which confirms the artistic orientation of all of the subisidiaries I identify.

[25]Recent examples include *Adaptation* and *Syriana*

tic merit since nominations enhance their personas; thus, Oscar nominations measure an additional dimension of private benefits which may influence star decisions not captured by the other measures. However, this definition also comes with a few empirical problems. First of all, Oscar nominations identify only a few films per year which have *ex post* achieved artistic success; the choices are highly idiosyncratic, so the probability of nomination may not correspond with stars' expected utility from making a film. Secondly, it is difficult to disentangle the effect of artistic merit from the promotional boost films receive after being nominated for Oscars. One way around this is to proxy for a film's artistic merit by considering previous Oscar nominations received by the cast, writers, and director. A third disadvantage is that only a few films per year are nominated for Oscars, so this method underestimates the number of artistic films. Because of these shortcomings, I focus on whether Oscar nominations influence studio choice by stars rather than using this as a way to determine whether artistic films are profitable.

The final definition of artistic films includes all films which have been shown at the Sundance Film Festival, which is the largest independent film festival in the United States and has been running since 1985 [26]. Using this definition has the advantage of identifying films which are intended to be artistically oriented. While admission to the festival is competitive, only the best films at Sundance are picked up by distributors for theatrical release, so films submitted and rejected from the festival are unlikely to appear in my dataset. Thus, this definition recognizes more than just *ex post* successful artistic films as does definition 2). The biggest disadvantage of this definition is that not all artistic films are submitted to the festival, so there may be significant misclassification of non-Sundance artistic films as commercial.

All three definitions of artistic films are somewhat parsimonious definitions of artistic films, so they are likely to misidentify some films as commercial films when in fact they were intended as artistic films. Moreover, there is spectrum of films with both artistic and commercial characteristics, so any definition is bound to impinge on this gray area. The three definitions are fairly uncorrelated (see Table 1), as they identify different types of artistic films. While each of them has weaknesses, we can get a fairly comprehensive view of artistic films by examining all three of them in turn.

[26]The festival was known as the Utah/US Film Festival starting in 1978, and in 1985 Robert Redford's Sundance Institute took over management of the festival. The festival's name was changed to the Sundance Film Festival in 1991

Table 1: Correlations between definitions of artistic films. The following table shows correlations between indicator variables denoting films included under the four definitions of artistic films.

Variables	Studio Art	Oscar	Sundance
Studio Art	1.000		
Oscar	0.063	1.000	
Sundance	0.142	-0.010	1.000

3.3 Definition of stars

Intuitively, I define stars as actors and directors who have unique talents which enhance the value of the films they are a part of. One function of this definition is to narrow down the list of actors and directors in my analysis, as data on each actor and director's films must be hand-collected. Since stars are the actors and directors most likely to provide value to the studio and therefore the ones studios are most likely to compete for, they are also the ones most relevent for analysis.

In order to identify the stars who fit this intuitive definition, I use Premiere magazine's annual list of the 100 most powerful people in Hollywood. The list includes executives, agents, as well as actors and directors, so the stars which appear on the list may be presumed to wield substantial bargaining power. My universe of stars consists of the 94 actors and 100 directors who have appeared on the list between 1990 and 2005. The Premiere 100 list has also been used to identify stars in previous work such as De Vany and Walls [2002b] and De Vany and Walls [1999]. Using this external definition of stardom allows me to test the hypothesis of whether stars add value to films. While the Premiere list identifies those players regarded by industry insiders as wielding power, this does not necessarily imply that these stars add value to films. In particular, I examine whether stars have significant positive fixed effects on film success, and it is not obvious ex ante that the industry would be able to distinguish between people who choose films with favorable characteristics and people who truly add value to films beyond its other characteristics. Thus, using the Premiere 100 list provides a way to test whether commonly held notions of stardom correspond with economic measures of value and verify one of the assumptions of my hypothesis.

Using the Premiere 100 list, I construct two different definitions of stars based on whether someone is currently on the list, was on the list in the

past, or will be on the list in the future. While major stars such as Tom Cruise and Stephen Spielberg remain on the list for many years, new stars are also added to the list as their popularity increases, and others drop off the list. The first definition I use includes any actor or director who appears on the list in any year. This definition assumes that stars have an intrinsic ability which is present even before they are widely recognized and persists even if they fade from popularity, and this ability is gradually discovered through time. Under the second definition, an actor or director is only a star in a given year if he or she appears on the Premiere list in the same year. This definition assumes that a star's ability varies through time and that the Premiere list captures these variations. Which of these definitions is more relevant depends on their economic significance, and I report results using both.

3.4 Descriptive Statistics

Table 2 shows descriptive statistics for my full sample of 6505 films, which contains nearly all films released in the U.S. between January 1, 1980 and June 30, 2005 excluding films which were still in theatres as of June 30, 2005. Revenues are pooled for re-releases, director's cuts, and other special showings. The "Sundance" variable is 1 for films which have been shown at the Sundance Film Festival (which has been in existence since 1985) and 0 otherwise. The "Powerful director" variable indicates films whose directors are ranked in the Premiere 100 in the year that the film is released, and the "Powerful director all films" variable indicates films whose directors are ranked in the Premiere 100 in any year. Similarly defined are "Powerful actor" and "Powerful actor all films". In the entire sample, about 3% of films are made by directors contemporaneously on the Premiere list, and about 10% are made by directors who have been on the list at some point. Reflecting the longer duration of a director's commitment to a film compared to an actor's (and hence the greater number of films an actor may make in her career), 9% and 25% of films contain actors who are contemporaneously on the Premiere list or have at any time been on the list, respectively. Since the Premiere 100 list starts only in 1990, Table 3 presents summary statistics for the 1990-2005 sample. As expected the means of the "Powerful director" and "Powerful actor" variables are higher, and there are also more Sundance films in this sample. Other variables are not significantly different between the two sample periods.

Both revenues and production budgets have highly skewed distributions with long right tails and very small medians compared to their means. Arthur De Vany and co-authors [27] have examined these distributions in depth and established that films are unique and extremely risky projects with revenues driven by extreme right-tail events that are difficult to forecast ex ante. While most film projects make very little if any profits, a few projects a year break through and make tremendous profits. Since artistic projects are very unlikely to become attain revenues in the positive extreme, the skewed nature of revenue distributions deepens the puzzle of why studios make artistic films.

Tables 4 and 5 show breakdowns of films by the column heading by rating and genre. The left panels show breakdowns by studio, and the right panels show breakdowns for all films, large studio films, artistic subsidiary films, independent films, oscar-nominated films, Sundance festival films, and films containing powerful actors or powerful directors. In Table 4, entries in each column show the percentage of films of row type, and in Table 5, entries in each column show the percentage of total (inflation-adjusted) budget allocated to films of row type. As noted in previous work such as Ravid and Basuroy [2004] and De Vany and Walls [2002b], very few G-rated films are made, whereas nearly half of all films are rated R. However, previous studies have not considered the amount of budget allocated to different ratings categories. While there are more than twice as many R-rated films as PG-13-rated films as seen in Table 4, when considering the budget allocations in Table 5, R-rated films receive only slightly more investment dollars than PG-13 films. With the exception of greater investment in G-rated films by Disney, budget and film allocations do not differ substantially between the major studios. However, there are key differences between commercial and artistic films, identified by the comparison between large-studio and subsidiary, Oscar-nominated, and Sundance festival filmes (corresponding to the three definitions of artistic film described above). While 31% of films and 62% of the budgets of large studios have ratings suitable for children (G, PG, or PG-13), only between 20-41% of the films and 37-46% of the budgets of artistic films are suitable for children. In addition, artistic films are much more likely to be dramas and romances and less likely to be thrillers or action movies than commercial films. Ratings and genre data are from the IMDB.

[27] See De Vany [2004] for a compendium of his work

Variable	Mean	Std. Dev.	Min.	Max.	N
Domestic gross($M)	25.96	49.56	0	708.80	6505
Runtime	1.74	0.33	0.03	6.67	6356
Prod. budget($M)	32.45	33.11	0	235.96	2634
Worldwide gross($M)	42.13	108.83	0	2399.13	6503
Studio Com	0.5	0.5	0	1	6599
Subsidiary	0.09	0.28	0	1	6599
Indie	0.41	0.49	0	1	6599
# Oscar noms	0.15	0.70	0	7	6599
Sundance	0.1	0.3	0	1	6599
Powerful director	0.03	0.17	0	1	6599
Powerful director all films	0.1	0.3	0	1	6599
Powerful actor	0.09	0.28	0	1	6599
Powerful actor all films	0.24	0.43	0	1	6599
Films with production budget data					
Domestic gross($M)	44.9	66.62	0	708.80	2616
Runtime	1.79	0.33	1.05	4.35	2612
Prod. budget($M)	32.45	33.11	0	235.96	2634
Worldwide gross($M)	81.10	151.83	0	2399.13	2615
Studio Com	0.61	0.49	0	1	2634
Subsidiary	0.11	0.31	0	1	2634
Indie	0.28	0.45	0	1	2634
# Oscar noms	0.24	0.9	0	7	2634
Sundance	0.09	0.28	0	1	2634
Powerful director	0.07	0.25	0	1	2634
Powerful director all films	0.2	0.4	0	1	2634
Powerful actor	0.18	0.38	0	1	2634
Powerful actor all films	0.37	0.48	0	1	2634

Table 2: Summary statistics for full sample 1980-2005.

Variable	Mean	Std. Dev.	Min.	Max.	N
Domestic gross($M)	23.58	47.48	0	708.80	4859
Runtime	1.74	0.35	0.03	6.67	4694
Prod. budget($M)	34.36	34.63	0	235.96	2205
Worldwide gross($M)	43.03	113.4	0	2399.13	4857
Studio Com	0.43	0.5	0	1	4909
Subsidiary	0.12	0.32	0	1	4909
Indie	0.45	0.5	0	1	4909
# Oscar noms	0.12	0.62	0	7	4909
Sundance	0.12	0.32	0	1	4909
Powerful director	0.04	0.2	0	1	4909
Powerful director all films	0.1	0.3	0	1	4909
Powerful actor	0.12	0.32	0	1	4909
Powerful actor all films	0.25	0.43	0	1	4909
Films with production budget data					
Domestic gross($M)	42.46	62.61	0	708.80	2192
Runtime	1.79	0.34	1.05	4.35	2184
Prod. budget($M)	34.36	34.63	0	235.96	2205
Worldwide gross($M)	82.43	156.33	0	2399.13	2191
Studio Com	0.59	0.49	0	1	2205
Subsidiary	0.13	0.34	0	1	2205
Indie	0.28	0.45	0	1	2205
# Oscar noms	0.22	0.85	0	7	2205
Sundance	0.1	0.3	0	1	2205
Powerful director	0.08	0.27	0	1	2205
Powerful director all films	0.19	0.4	0	1	2205
Powerful actor	0.21	0.41	0	1	2205
Powerful actor all films	0.39	0.49	0	1	2205

Table 3: Summary statistics for 1990-2005 .

	WB	Para	Sony	MGM	Fox	Uni	Dis	All	Large	Sub	Indep	Osc nom	Sun	Pow dir	Pow act
G	3	2	2	3	1	2	9	3	3	2	2	1	1	1	3
PG	23	21	18	24	19	27	24	17	24	9	9	19	7	13	11
PG-13	25	29	29	21	31	28	25	20	28	20	10	21	12	43	40
R	49	48	50	51	48	43	41	47	43	67	47	56	63	42	47
Unrated	0	0	1	1	1	0	1	12	0	1	29	1	15	0	0
Sequel	9	9	5	7	6	7	6	5	7	5	3	2	0	14	7
Action	22	19	18	19	21	22	15	16	21	11	11	8	4	31	27
Comedy	43	44	44	37	50	49	53	40	46	43	31	31	34	39	48
Drama	50	50	57	53	53	45	52	53	48	64	54	89	70	63	61
Romance	17	19	22	19	23	15	22	17	19	24	14	25	19	21	25
Thriller	27	25	23	24	25	20	15	19	24	17	14	15	14	33	33

Table 4: Genre and Ratings allocations by type of studio. The table presents the percentage of films of type indicated by each column with the characteristics in each row. The left portion of the table shows breakdowns by studio conglomerate, which includes films by both commercial and artistic divisions. The "Large" category includes films released by the seven large studios excluding those from artistic divisions, and the "Sub" category includes films released by all artistic subsidiaries of large studios. The "Indep." category includes all films not released by major studios or artistic subsidiaries, but includes films released by artistic firms which were later acquired by large studios. The "Osc nom" category includes all films which were nominated for at least one Oscar in the following categories: best film, best director, best actor, best supporting actor, best actress, best supporting actress, best original screenplay, and best adapted screenplay. The "Sun" category includes all films which have beem exhibited at the Sundance Film Festival.

	WB	Para	Sony	MGM	Fox	Uni	Dis	All	Large	Sub	Indep	Osc nom	Sun	Pow dir	Pow act
G	2	1	1	0	1	1	13	3	3	2	3	2	0	2	3
PG	16	17	13	21	16	22	26	18	19	6	15	14	20	13	10
PG-13	36	39	42	45	47	44	30	38	40	29	25	29	20	49	45
R	45	43	44	33	36	32	31	40	37	61	50	54	59	35	42
Unrated	0	0	0	0	0	0	0	1	0	2	6	0	1	0	0
Sequel	18	14	10	20	14	11	6	12	13	5	6	5	0	25	12
Action	44	40	37	44	51	37	30	37	41	17	21	24	10	47	41
Comedy	36	33	42	28	34	43	49	39	39	40	38	28	42	31	42
Drama	44	50	45	44	44	44	49	46	44	68	50	86	70	50	56
Romance	15	19	18	19	21	16	22	18	17	33	13	23	19	22	22
Thriller	38	83	32	112	45	30	23	36	39	21	26	17	34	41	39

Table 5: Genre and Ratings budget allocations by type of studio. The table presents the budget allocated for films of type indicated by each column with the characteristics in each row as a percentage of the total budget for each film type for the entire period from 1980-2005. The left portion of the table shows breakdowns by studio conglomerate, which includes films by both commercial and artistic divisions. The "Large" category includes films released by the seven large studios excluding those from artistic divisions, and the "Sub" category includes films released by all artistic subsidiaries of large studios. The "Indep." category includes all films not released by major studios or artistic subsidiaries, but includes films released by artistic firms which were later acquired by large studios. The "Osc nom" category includes all films which were nominated for at least one Oscar in the following categories: best film, best director, best actor, best supporting actor, best actress, best supporting actress, best original screenplay, and best adapted screenplay. The "Sun" category includes all films which were exhibited at the Sundance Film Festival.

4 Results

4.1 Determinants of film profitability

As in previous studies such as Litman and Kohl [1989], De Vany and Walls [1999], and Ravid [1999], I consider the factors which influence film revenues by running regressions of log revenue on film characteristics. My setup constrasts with previous studies both in size and comprehensiveness of the sample, as well as the set of control variables used. While most previous studies have included MPAA rating as a control, I aim to control for a broad set of film characteristics which mainly reflect variables which can be controlled by a studio *before* a film is released. Thus, while critical reviews have been shown to impact film revenues, I do not include them since studios cannot control critical response. On the other hand, studios can control film budget, film length, and director and casting choices in hopes of impacting film quality. The only ex-post characteristic I use is a variable indicating whether the film had been nominated for an Oscar in a major category, and the inclusion of this variable is mainly used as a distinguishing characteristic of artistic films as opposed to a determinant of revenue. Estimated production budgets are available for over 2500 films, so at least some adjustment can be made for cost. However, a major weakness to the data set is that project returns are unobservable, and in addition, some components of both cost (e.g. advertising, overhead, film duplication) and revenue (e.g. television, DVD, merchandizing) are missing. One reason for looking at revenues is that despite the greater financial importance of returns, film revenues continue to be the standard benchmark for success among industry insiders [28].

Much of the analysis in the following sections is based on a basic regression with log inflation-adjusted worldwide revenues on (in December 2004 dollars) and independent variables including film length (in hours), production budget (estimated in millions $), IMDB genres (films may have more than one genre), a dummy variable for whether or not the film is part of a series or franchise, dummies for MPAA rating (omitted category is unrated), a dummy for whether the film was distributed by one of the major studios, a dummy for whether the film was distributed by one of the artistic divisions (this variable can only equal 1 if the previous is also 1), a dummy for inclusion in the Sundance Film Festival, a count of the number of Oscar

[28] Film revenues are the primary metric for film success in the industry press, and profit maximization has been documented in studies such as Ravid and Basuroy [2004]

nominations in eight major categories, a dummy for whether the film was directed by a "powerful directors", a dummy for whether the film includes a "powerful actor", and year and month dummies. Table 6 shows the results of these regressions. In this analysis, powerful directors and actors are defined as stars which appear on the Premiere list in any year, but results are similar using stars which appear on the list in the same year a film is released.

According to Table 6, many factors influence film revenues. In particular, the regressions highlight characteristics which the studio can easily control ahead of time, such as film length, genre, and ratings. In the absense of unobserved constraints, studio executives should be able to allocate investment according to films with the desired characteristics, and in a revenue-maximization framework, we would expect to see more investment in film categories which achieve higher revenues.

Film length has a positive and significant coefficient with respect to film revenue. Films in the sample have an average length of about 1 hour and 45 minutes, and naively, one might suppose that films with shorter running times would earn more money because exhibitors are able to turn the theatres around faster. However, the positive relationship between runtimes and revenues suggests that there is a countervailing effect, this effect becomes even stronger after removing very short and very long films. One explanation is that audiences prefer longer movies to get more value for the price of a ticket.

Consistent with previous studies, ratings are also highly significant determinants of revenue. However, in contrast to studies such as Ravid and Basuroy [2004], Ravid [1999] and De Vany and Walls [2002b] which find revenue effects to decrease as ratings become more restrictive, in my results PG-13 films have the highest coefficient relative to unrated films, followed by G, R and PG. All ratings categories have positive and significant coefficients relative to unrated films, and an F-test rejects the hypothesis that all of the ratings coefficients are equal.

As would be expected, films distributed by large studios have much higher revenues than films distributed independently. Studio films perform better even after controlling for budget and film characteristics, possibly owing to studios' superior experience and marketing expertise over smaller film companies. However, the benefit of large studio distribution is mitigated for films distributed by artistic subsidiaries. This lends support to the contention that the films produced by artistically-oriented subsidiaries are less profitable than those produced by the studio at large, raising the question of why studios fund such subsidiaries. Similarly, as shown in the third column of Table 6

	(1)	(2)	(3)	(4)	(5)
Runtime	0.733	0.733	0.741	0.476	0.734
	(5.68)***	(5.65)***	(5.74)***	(3.69)***	(5.69)***
Log budget	0.529	0.536	0.552	0.528	0.523
	(14.27)***	(15.21)***	(15.76)***	(14.27)***	(13.83)***
Sequel	0.875	0.876	0.865	0.871	0.869
	(10.27)***	(10.31)***	(10.16)***	(10.23)***	(10.04)***
G	1.568	1.560	1.539	1.468	1.583
	(5.91)***	(5.93)***	(5.89)***	(5.68)***	(6.00)***
PG	1.434	1.425	1.400	1.381	1.443
	(7.21)***	(7.28)***	(7.26)***	(7.02)***	(7.26)***
PG-13	1.893	1.880	1.855	1.841	1.888
	(9.70)***	(9.96)***	(9.94)***	(9.42)***	(9.75)***
R	1.469	1.454	1.404	1.402	1.466
	(8.39)***	(8.40)***	(8.28)***	(7.99)***	(8.44)***
Powerful director all films	0.576	0.576	0.581	0.427	
	(8.06)***	(8.10)***	(8.11)***	(6.34)***	
Powerful director pre					0.580
					(6.75)***
Powerful director					0.520
					(5.10)***
Powerful actor all films	0.728	0.729	0.729	0.694	
	(9.91)***	(9.89)***	(9.87)***	(9.68)***	
Powerful actor pre					0.636
					(8.07)***
Powerful actor					0.864
					(8.26)***
Studio	1.064	1.062	1.046	1.095	1.064
	(10.00)***	(9.78)***	(9.23)***	(10.94)***	(9.94)***
Subsidiary	-0.360	-0.385		-0.459	-0.357
	(2.55)**	(2.77)***		(3.35)***	(2.54)**
Sundance		0.077	0.397		
		(0.43)	(1.73)*		
Subsidiary*Sundance		0.094			
		(0.32)			
Studio*Sundance			-0.618		
			(2.13)**		
# Oscar noms				0.236	
				(13.49)***	
Genre FE	yes 23	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes
Month FE	no	no	no	no	no
Observations	2596	2596	2596	2596	2596
R-squared	0.59	0.59	0.59	0.61	0.59

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

while films shown at the Sundance film festival perform better than other independent films with similar characteristics, studio-distributed Sundance films fare worse than other studio films. Moreover, coefficient on the *studio*Sundance* interaction term is similar in magnitude to the coefficient on *Subsidiary*.

While I use Oscar nominations as a way to proxy for a film's artistic merit, it is not appropriate to use Oscar nominations to judge a film's *ex ante* profitability since Oscar nominations are normally awarded to relatively successful films and nominations are highly unpredictable. Moreover, many films remain in theatres after nominations are announced, and the nominations themselves are a large source of publicity for these films. Thus, in contrast to the other proxies for artistic merit, Oscar nominations increase film revenues.

Many previous studies have demonstrated the economic value of stars. John et al. [2002] show that star directors seem to have a positive fixed effects on returns. In contrast, Ravid [1999] and Ravid and Basuroy [2004] suggest that star actors have no significant effect on revenues after controlling for budget. In my sample, the *Powerful Director* and *Powerful Actor* variables are both positive and highly significant, indicating that stars have convey a positive economic benefit to studios even after controlling for budget and other film characteristics. Including a count of the number of star actors instead of using a dummy variable is also positive and significant, and the coefficient drops to between 0.4 and 0.5, suggesting that additional star actors add value beyond the first star actor. In unreported regressions, the effect of actors and directors is higher for stars ranked higher on the Premiere 100 list, suggesting that the list identifies stars with high individual ability as opposed to stars which selectively choose films in higher-revenue categories.

Table 7 presents results similar to those in Table 6 using the return on investment as the dependent variable. The return is defined as the total worldwide revenue divided by the production budget minus 1. This variable may not capture the true return on film projects because it fails to take into account costs of marketing, overhead costs, and contingent compensation, and it also neglicts revenues from DVD, television, and other ancilliary markets. However, as argued in Ravid [1999], it may be a reasonable proxy for returns if real revenues are a constant multiple of worldwide film revenues and real costs are a constant multiple of production costs. Although the predictive power of film characteristics is much lower than for revenues, the signs and significance are generally consistent with those for revenues. As in

the revenue regressions, longer runtime, sequels, and stars are positively correlated with returns. Moreover, as with revenues, R-rated films have lower returns than films with other ratings. In addition, studio films exhibit higher returns, while subsidiary films have lower returns than other studio films. Sundance films made by large studios also perform worse than other studio films, although this effect is not significant. The major difference between results using returns and those for revenues is that budget is negatively related to film performance. The contrast between these results suggests that while higher budgets increase revenues, they do not increase them proportionally to the increase in costs, so they negatively affect returns.

4.1.1 Ratings Effects

Previous studies have identified film ratings as a characteristic which potentially identifies inefficient investment by studios. De Vany and Walls [2002b] find that when fitting the distribution of film revenues with a stable paretian statistical model, R-rated films are stochastically dominated by all other ratings categories. Ravid and Basuroy [2004] and Ravid [1999] also conclude the R is the least profitable ratings category, but Ravid and Basuroy [2004] suggest that studio managers may find R-rated films with sex or violence favorable because they are less risky. Thus the preponderance of investment in R-rated films (see also Tables 4 and 5) seems inconsistent with measures of their value to studios.

In my sample, I find qualitatively similar results. The left panel of Table 8 shows the ratings fixed effects in regressions similar to those shown in Table 6 with log worldwide revenue as the dependent variable and controlling for film length, log production budget, ratings dummies, dummies for the presence of powerful actors and directors, and dummies for studio and subsidiary films (where appropriate). Each column represents coefficient estimates for the above regression restricted to different commercial and artistic film categories. In the estimates using all films, G-rated films have the largest fixed-effect, followed by PG-13- and PG-rated films, with R-rated films having the smallest fixed effect. These results are very similar when the regression is restricted to either large-studio films (excluding those by artistic subsidiaries) or Oscar-nominated films.

However, when the sample is restricted to subsidiary or Sundance films, the results change dramatically, as shown in the third column of Table 8. While the correlation between the fixed effects for large studio and Oscar-

	(1)	(2)	(3)	(4)	(5)
Runtime	7.670	8.233	8.488	6.407	7.462
	(2.46)**	(2.38)**	(2.36)**	(2.29)**	(2.54)**
Log budget	-12.117	-10.971	-10.767	-12.126	-12.217
	(2.16)**	(2.30)**	(2.28)**	(2.16)**	(2.15)**
Sequel	-0.763	-0.528	-0.881	-0.779	-1.013
	(0.32)	(0.24)	(0.37)	(0.33)	(0.40)
G	1.568	19.381	18.772	20.369	21.125
	(5.91)***	(1.47)	(1.48)	(1.42)	(1.44)
PG	1.434	18.426	17.825	20.325	20.720
	(7.21)***	(1.60)	(1.61)	(1.53)	(1.54)
PG-13	1.893	17.463	16.557	20.109	20.251
	(9.70)***	(1.87)*	(1.93)*	(1.74)*	(1.75)*
R	1.469	12.467	11.250	15.268	15.569
	(8.39)***	(1.87)*	(1.90)*	(1.72)*	(1.74)*
Powerful director all	4.844	4.697	4.851	4.107	
	(3.23)***	(3.24)***	(3.10)***	(3.19)***	
Powerful director nolist					4.114
					(3.75)***
Powerful director					5.903
					(2.01)**
Powerful actor all	7.227	7.339	7.031	7.060	
	(1.86)*	(1.83)*	(1.91)*	(1.84)*	
Powerful actor nolist					5.729
					(1.84)*
Powerful actor					9.206
					(1.90)*
Studio	6.467	7.447	9.745	6.621	6.460
	(2.41)**	(2.14)**	(1.60)	(2.43)**	(2.42)**
Subsidiary	-6.838	-4.063		-7.325	-6.768
	(1.58)	(1.86)*		(1.64)	(1.58)
Sundance		24.212	38.811		
		(1.08)	(1.07)		
Subsidiary*Sundance		-23.338			
		(0.86)			
Studio*Sundance			-40.649		
			(1.00)		
# Oscar noms				1.166	
				(2.82)***	
Genre FE	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes
Month FE	no	no	no	no	no
Observations	2596	2596	2596	2596	2596
R-squared	0.04	0.04	0.04	0.04	0.04

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

nominated films is 0.96, the correlations with subsidiary and Sundance films are -0.74 and -0.37, respectively. These results again confirm that Oscar nominations identify a fundamentally different type of film than artistic subsidiaries or the Sundance Film Festival. For subsidiary films, the PG-13 category has the largest fixed effect, followed by R, with PG and G trailing far behind. A similar ranking holds for Sundance films, although the festival contained no G-rated films, so that coefficient was ommitted. All estimates are significant at the 1% level, and an F-test rejects the hypothesis that the coefficients are jointly equal. The results are robust when controlling for studio and subsidiary fixed effects instead of using dummy variables.

In contrast to the ratings fixed effects, the budget allocations among ratings categories (as shown in the right panel of Table 8) display similar pattern for all types of films; with one exception, all of the pairwise correlations between budget allocations exceed 0.8. Overall, while little is invested in G-rated films, more goes toward PG films, and PG-13 and R films receive the most investment. Thus, since the ratings fixed effects are different between artistic and commercial films while the allocation of investment is similar, there must be a disconnect between investment and expected revenue for either artistic or commerical films.

To explore the relationship between investment and expected revenue, Table 11 shows the correlations between investment and ratings fixed effects for all films, large-studio films, and artistic films using the three definitions discussed previously. The entry in row i and column j of the table represents the correlation

$$Corr_{ij} = Corr(FE_i, Bud_j) \quad i, j \in \{\text{All, LargeStud, Sub, OscNom, Sun}\}$$

where FE_i and Bud_j are vectors of fixed effects and budget allocations corresponding to the columns of Table 8. If studios allocated investment dollars to ratings categories freely based on potential revenues, then we would expect the investment dollars allocated to the ratings categories to be positively correlated with their revenue fixed effects. Furthermore, if the revenues of commercial and artistic films are determined differently, then we would expect budget allocations to correpond with fixed effects for the same type of film, but not with the fixed effects of other film types. That is, we would expect the diagonal entries of Table 11 to be positive, while the non-diagonal entries may not be.

	Regression Coefficient					Total Budget ($M)				
	All films	Large stud	Subsid	Oscar nom	Sun	All films	Large stud	Subsid	Oscar nom	Sun
G	2.556	2.605	0.029	2.152		2775	2480	81	214	
PG	1.728	1.697	0.404	1.658	-0.112	15865	13938	265	1319	343
PG-13	1.823	1.621	1.358	1.393	1.043	32802	28565	1257	2648	332
R	1.449	1.39	0.825	1.124	0.603	35576	27015	2637	4929	995

Table 8: Ratings Effects and Allocations. Left panel: coefficients on dummies for MPAA rating in regressions of the log of worldwide revenue on film length, log production budget, ratings dummies, dummies for the presence of powerful actors and directors, and dummies for studio and subsidiary films (where appropriate). All ratings dummies are significant at the 1% level. Right panel: Aggregate budget (in millions) allocated to each ratings catgory by film type adjusted for inflation to December 2004 dollars.

	Allocation category				
	(1)	(2)	(3)	(4)	(5)
Regression population	All films	Large stud	Subsidiary	Oscar nom	Sundance
(1) All films	-0.851	-0.828	-0.742	-0.840	-0.973
(2) Large stud	-0.907	-0.900	-0.740	-0.836	-0.968
(3) Subsidiary	0.892	0.939	0.608	0.646	-0.082
(4) Oscar nom	-0.975	-0.949	-0.895	-0.950	-0.861
(5) Sundance	0.869	0.958	0.536	0.487	0.122

Table 9: Correlations between ratings effects and allocations. Correlations between vectors of ratings fixed effects and budget allocations to the four ratings G, PG, PG-13, and R for five film categories: all films, large-studio films (excluding artistic subsidiary films), subsidiary films, Oscar-nominated films, and Sundance films. The entry in row i, column j represents the correlation between the vector of fixed effects for films of category i and the vector of budget allocations for films of category j.

In contrast to these expectations, Table 11 shows a general negative correlation between revenue fixed effects and investment. In addition, a striking pattern emerges when comparing the correlation between investment and the fixed effects for commercial films (row 2) with the correlation between investment and the fixed effects for artistic films (rows 3-5). From row 2, the correlation between investment and large-studio fixed effects are negative for all types of films. In contrast, when using fixed effects for subsidiary or Sundance film (rows 3 and 5), these correlations become positive. That is, studios seem to investment in both commercial and artistic films is allocated to categories which make artistic films successful. Thus, although the determinantes of revenue are very different for commercial and artistic films, investment follows the film types which make for successful *artistic* films. This result is all the more suprising since artistic films make up only a fraction of films released. In this analysis, the determinants of revenue for Oscar-nominated films much more closely resemble those for large-studio films than for subsidiary or Sundance films, suggesting that the audience for Oscar-nominated films is different than that for subsidiary or Sundance films.

4.1.2 Genre Effects

Genre also plays an important role in film revenue, and the coefficients for dummy variables based on IMDB genre categories are explored in the left panel of Table 10. The entries represent the genre fixed effects in regressions of log revenue controlling for film length, log production budget, ratings dummies, dummies for the presence of powerful actors and directors, and dummies for studio and subsidiary films (where appropriate). Each column represents coefficient estimates for the above regression restricted to different commercial and artistic film categories. While the impact of genre has not been explored extensively in the literature, I find that film genre is highly predictive of film revenue. Indeed, it seems intuitive that potential audience size is highly related to genre - perhaps some moviegoers prefer to watch comedies while some prefer dramas, and some may specialize in genres such as horror or science fiction.

Overall, while action, animation, comedy, horror, mystery, and romance films receive significantly higher revenues, dramatic and war films receive significantly lower revenues. However, similarly to the impact of genre may differs among the different categories of films, especially between large-studio and subsidiary films. While the coefficient for documentaries is positive and significant for large-studio films, it is negative and insignificant for subsidiary films. Mystery is also positive for large-studio films and negative for subsidiary films. While *Family* is positive and significant for large-studio and Sundance films, it is negative and significant for subsidiary films. Mystery films show a similar pattern. The results are unchanged when controlling for studio and subsidiary fixed effects instead of using dummy variables for studio and subsidiary films.

As with investment by rating, the right panel of Table 10) shows pattern of investment which is similar among genres for all types of films; all pairwise correlations between budget allocations exceed 0.68. Table **??** shows the correlations between investment and genre fixed effects for all films, large-studio films, and artistic films using the three definitions discussed previously. The entry in row i and column j of the table represents the correlation

$$Corr_{ij} = Corr(FE_i, Bud_j) \quad i, j \in \{\text{All, LargeStud, Sub, OscNom, Sun}\}$$

where FE_i and Bud_j are vectors of fixed effects and budget allocations corresponding to the columns of Table 10. As in the previous section, we

	Regression Coefficient					Total Budget ($M)				
	All films	Large stud	Subsid	Oscar nom	Sund	All films	Large stud	Subsid	Oscar nom	Sund
Action	0.474 ***	0.386 ***	1.027 *	0.211	0.878	32460	29350	754	2187	169
Adventure	0.123	0.072	-0.106	0.442	-0.151	22728	20432	303	1762	231
Animation	0.692 ***	0.646 ***	0.817	0.066	0.000	4332	3948	63	321	
Biography	-0.033	-0.474 ***	-0.170	-0.308	0.784	4303	2466	289	1519	29
Comedy	0.230 ***	0.123	0.684 ***	-0.160	0.172	33362	28340	1741	2575	706
Crime	-0.136	-0.224 ***	-0.332	-0.107	-0.096	14485	11566	821	1691	407
Documentary	0.512	1.142 **	-0.340	0.000	0.891	74	32	36		6
Drama	-0.218 ***	-0.204 ***	-0.177	-0.650 **	-0.388	44074	32052	2959	7882	1181
Family	0.784 ***	0.754 ***	-1.932 **	0.662	1.280 **	9712	9054	179	461	18
Fantasy	0.016	-0.026	0.003	-0.182	-0.540	14292	12889	421	895	87
Horror	0.630 ***	0.379 ***	1.311 **	-0.258 ***	1.293 **	6988	6499	318	69	102
Music	-0.181	-0.253 *	-0.581	-0.137	-1.232	4144	3169	334	541	100
Mystery	0.321 *	0.229 *	-1.285 *	0.019	0.055	5817	5103	116	343	255
Romance	0.312 ***	0.212 **	0.124	0.185 *	0.570	16378	12469	1452	2126	331
Scifi	-0.061	-0.082	-0.029	0.309	-0.742	13444	12606	247	327	264
Thriller	0.147	0.214 **	0.103	0.022	0.430	30915	27813	926	1592	584
War	-0.479 **	-0.319 *	-0.846	-0.309	-1.435 **	4871	3474	210	1171	16

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10: Genre Effects and Allocations. Left panel: coefficients on dummies for IMDB genres in regressions of the log of worldwide revenue on film length, log production budget, ratings dummies, dummies for the presence of powerful actors and directors, and dummies for studio and subsidiary films (where appropriate). Right panel: Aggregate budget (in millions) allocated to each genre by film type adjusted for inflation to December 2004 dollars.

	Allocation category				
	(1)	(2)	(3)	(4)	(5)
Regression population	All films	Large stud	Subsidiary	Oscar nom	Sundance
(1) All films	-0.155	-0.094	-0.269	-0.339	-0.257
(2) Large stud	-0.179	-0.128	-0.271	-0.292	-0.234
(3) Subsid	0.311	0.340	0.210	0.084	0.208
(4) Oscar nom	-0.135	-0.037	-0.451	-0.487	-0.398
(5) Sund	0.019	0.052	-0.047	-0.081	-0.129

Table 11: Correlations between genre effects and allocations. Correlations between vectors of genre fixed effects and budget allocations to the genres and for film categories in Table **??**. The entry in row i, column j represents the correlation between the vector of fixed effects for films of category i and the vector of budget allocations for films of category j.

expect the investment dollars to be positively correlated with revenue fixed effects.

Once again, Table **??** shows a general negative correlation between revenue fixed effects and investment. That is, there appears to be investment in genres which have less expected revenue, and vice versa. Instead, as shown in row (2), film producers overall invest more in genres correlated with success for subsidiary films, and a similar but less pronounced effect is shown for Sundance films in row (5).

4.1.3 Seasonality in revenues

There is clear seasonality in film revenues, and results using month dummies are shown in table 12. The two major season for film releases are the summer months in June and July when children are on summer break and the holiday season in November and December, when people take holidays and when most Oscar contenders are released. While the fixed effects during both peak seasons are comparable, films released during the summer months have slightly greater advantage.

Moreover, the release date is an endogenous decision made by studios which is expected to be correlated with unobserved film quality. Although release schedules for major films may be decided well in advance, studios commonly adjust release schedules to position the films with the highest expectations during weekends with the largest potential audience, and they

frequently change scheduled release dates based on their observations as the film is produced. Ideally, I would like to instrument for the release date with a variable which is independent of unobservable film quality, but the data do not provide such a variable. Thus, while the coefficients discussed in the previous sections remain qualitatively unaffected by the inclusion of month dummies, I will not focus on these results because due to the endogeneity problem.

4.1.4 Star fixed effects

To determine the economic value of stars, I examine the coefficients of variables indicating star participation in films, a similar technique to that of De Vany and Walls [1999] and John et al. [2002]. Consistent with their results, I find that stars generally have a positive and significant effect on both film revenues and returns in the multinomial setting. I calculate star fixed effects using regressions of log revenues on film characteristics with studio and subsidiary fixed effects. Of the star directors, 82 out of 100 coefficients are positive, and 39 of those are significant. Among the 100 star actors, 73 are positive, and 31 have positive and significant coefficients. See Appendix C for the actors and directors who have positive and significant fixed effects.

4.1.5 Star career paths

The main paper in the literature which explores the career paths of stars has been John et al. [2002], who examine firing and rehiring decisions for directors. While they examine the short-term contracts common in the film industry as a way for studios to discover talented directors and weed out untalented ones, in this study I focus on the subset of high-ability stars. Once stars have been identified on the Premiere 100 list, presumably there is no longer a question as to their ability. Then, the employment contract becomes less a question of whether the star will be rehired by a studio, but rather which studio the star chooses to work with.

Among the 100 star directors in my sample, the average career length is 7 films, with a standard deviation of about 5. Among the 94 star actors, the average career length is 22 films with a standard deviation of 10. Table 14 shows the percentage of films with star actors or directors made by large studios and which fall into the three artistic film categories. The left panel shows the percentage of stars with *any* film in the given categories, and the

	(1)	(2)	(3)	(4)
Runtime	0.672	0.672	0.684	0.445
	(5.22)***	(5.17)***	(5.27)***	(3.49)***
Log budget	0.526	0.530	0.547	0.527
	(14.19)***	(14.94)***	(15.59)***	(14.21)***
Sequel	0.823	0.824	0.814	0.827
	(9.50)***	(9.53)***	(9.40)***	(9.62)***
G	1.583	1.579	1.556	1.477
	(5.88)***	(5.89)***	(5.85)***	(5.65)***
PG	1.482	1.476	1.450	1.427
	(7.22)***	(7.27)***	(7.25)***	(7.01)***
PG-13	1.938	1.931	1.906	1.887
	(9.63)***	(9.85)***	(9.84)***	(9.33)***
R	1.535	1.526	1.473	1.465
	(8.43)***	(8.42)***	(8.31)***	(8.02)***
Powerful director	0.551	0.552	0.558	0.404
	(7.71)***	(7.76)***	(7.78)***	(6.01)***
Powerful Actor	0.697	0.698	0.698	0.668
	(9.46)***	(9.45)***	(9.42)***	(9.35)***
Studio	1.049	1.046	1.023	1.082
	(9.71)***	(9.49)***	(8.92)***	(10.50)***
Subsidiary	-0.388	-0.414		-0.476
	(2.69)***	(2.94)***		(3.40)***
Sundance		0.034	0.350	
		(0.19)	(1.51)	
Studio*Sundance			-0.609	
			(2.08)**	
Subsidiary*Sundance		0.111		
		(0.38)		
# Oscar noms				0.454
				(13.55)***
Observations	2598	2598	2598	2598
R-squared	0.59	0.59	0.59	0.62
Robust t statistics in parentheses				
* significant at 10%; ** significant at 5%; *** significant at 1%				

Table 12: Determinants of film revenue including month fixed effects. This table presents results of OLS regressions of log revenue (in December 2004 dollars) on explanatory characteristics. Robust standard errors are reported with clustering at the studio-year level

	% with any film		Avg # of films	
	Actors	Directors	Actors	Directors
Studio	99	94	83	81
Subsidiary	65	25	9	11
Sundance	52	23	5	7
Oscar nominated	80	59	14	21

Table 13: Career statistics. The left shows the percentage of all stars who have made each type of film at some point in their careers. The right panel shows the average number of films of each type made by stars.

right panel shows the average percentage of films in each category. While nearly all stars have at least one film distributed by a major studio and many of them have at least one artistic film, the average percentages of artistic films are much lower.

Tables 4.1.5 and 4.1.5 show the average career paths of actors and directors in terms of the types of films that they make over the course of their careers. If it were the case that stars have typical career paths whereby they make artistic films early in their careers and commercial films later, then I may spuriously find that artistic films increase star value by capturing these career cycle effects. However, there appears to be no systematic pattern in the types of films made by stars throughout their careers. As shown in Figure 4.1.5, actors tend to make slightly more studio films and subsidiary films as their careers progress, but the trend is not strong. Directors seem to exhibit a stronger tendency to make subsidiary films later in their careers, so considering past subsidiary films may positively bias estimates of the productivity impact of artistic films. However, controlling for career length should mitigate this problem.

In order to explore whether artistic films improve the productivity of stars, I examine whether doing artistic films enhances the value of a star's later films. Table 14 shows the results of regressions similar to those in Table 6 when actor career characteristics are added. Consistent with the intuition of John et al. [2002], who posit that stars who are able to make more films are more likely to have high ability, the number of films that the star has previously done is positive and significant in determining revenues for films which contain star actors. Although the number of artistic films a star has done previously does not add significantly to revenues above the number of

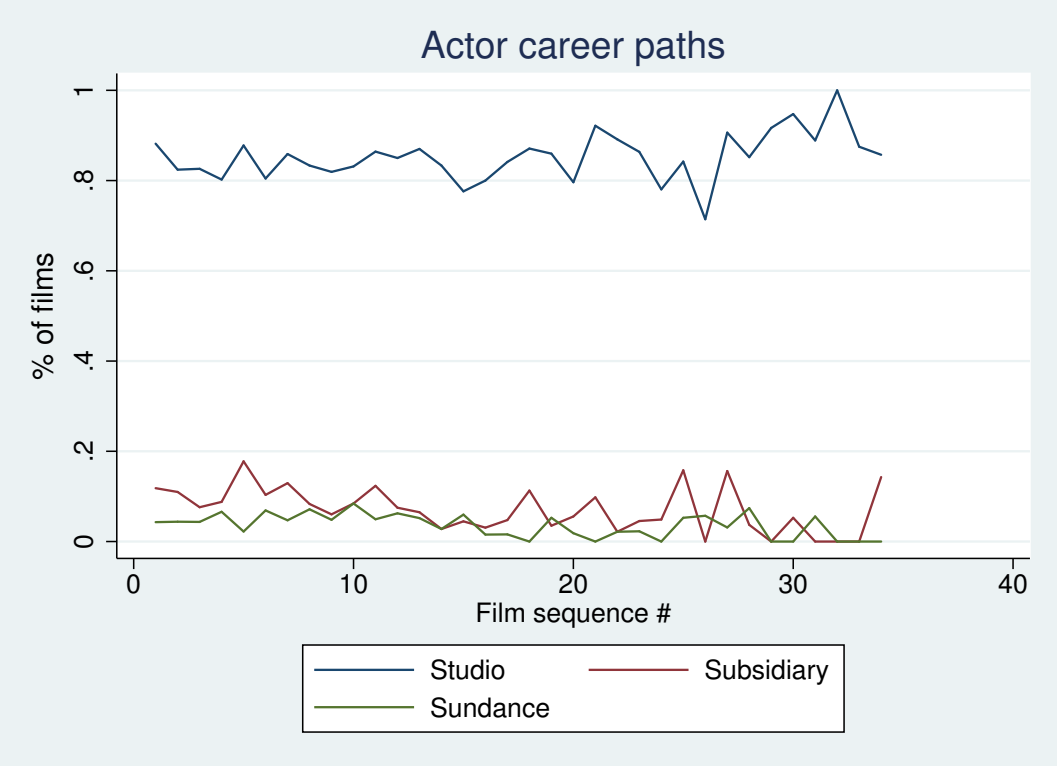

Figure 1: Average career path of actors. The figure shows the percentage of studio films, subsidiary films, and Sundance films made by actors according to chronological film sequence.

total films, the coefficients for both the number of previous subsidiary films and the number of previous Sundance films are positive. Table 15 shows similar results for directors, although there the coefficient for Sundance films is negative.

4.2 Artistic films and studio choice

In this section, I examine the hypothesis that artistic films help studios attract stars. Section 4.1 showed that stars appear to generate value for studios, so if it holds, this hypothesis suggests an economic motivation for producing artistic films. To model studio choice by stars, I assume that stars choose

	(1)	(2)	(3)	(4)
Film count actor	0.044	0.040	0.038	0.040
	(6.42)***	(4.78)***	(5.67)***	(5.43)***
Sub count actor			0.069	
			(1.14)	
Sun count actor				0.111
				(1.38)
Cum Oscar noms actor		0.011		
		(0.75)		
Actor FE	yes	yes	yes	yes
Director FE	yes	yes	yes	yes
Studio FE	yes	yes	yes	yes
Subsidiary FE	yes	yes	yes	yes
Genre FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Month FE	no	no	no	no
Observations	6271		6271	6271
R-squared	0.58		0.58	0.58
Robust t statistics in parentheses				
* significant at 10%; ** significant at 5%; *** significant at 1%				

Table 14: Revenue regressions on actor career variables. This table presents results of regressions similar to those in Table 6 of log worldwide revenue on film characteristics. In addition, if the film contains star actors (those who were on the Premiere list in any year), variables are included which indicate the number of films the star has done previous to the current film and the number of subsidiary and Sundance films the star has previously done. In the event that a film contains more than one star, the average values for the two stars is used.

	(1)	(2)	(3)	(4)
Film count director	0.066	0.097	0.062	0.069
	(3.41)***	(4.43)***	(2.80)***	(3.40)***
Sub count director			0.063	
			(0.67)	
Sun count director				-0.105
				(0.51)
Cum Oscar noms director		-0.336		
		(2.50)**		
Observations	6268	6268	6268	6268
R-squared	0.57	0.57	0.57	0.57
Actor FE	yes	yes	yes	yes
Director FE	yes	yes	yes	yes
Studio FE	yes	yes	yes	yes
Subsidiary FE	yes	yes	yes	yes
Genre FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Month FE	no	no	no	no
Observations	2598	2598	2598	2598
R-squared	0.04	0.04	0.04	0.04
Robust t statistics in parentheses				
* significant at 10%; ** significant at 5%; *** significant at 1%				

Table 15: Revenue regressions on actor career variables. This table presents results of regressions similar to those in Table 6 of log worldwide revenue on film characteristics. In addition, if the film contains star actors (those who were on the Premiere list in any year), variables are included which indicate the number of films the star has done previous to the current film and the number of subsidiary and Sundance films the star has previously done. In the event that a film contains more than one star, the average values for the two stars is used.

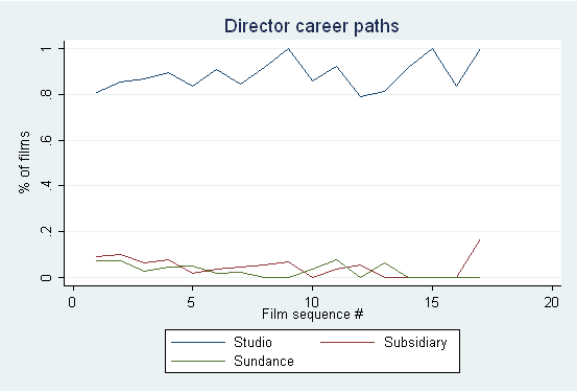

Figure 2: Average career path of directors. The figure shows the percentage of studio films, subsidiary films, and Sundance films made by directors according to chronological film sequence.

between the seven major studios based on studio characteristics and on the past relationship between the star and studio. Since this study mainly concerns the production of artistic films by major studios, I do not model the choice of independent distribution. Assuming the independence of irrelevant alternatives, this modelling choice is valid.

Given that my definition of stars consists of people whom Hollywood insiders identify as wielding considerable power in the industry. As previous studies have indicated, stars with real economic value are scarce, so all of the studios must clamor for the attention of these talented few. Thus, I assume that the stars identified in my sample are sufficiently in-demand that they would at any given time have outstanding opportunities to work with any of the seven major studios; and moreover, that the studios compete for stars and not vice versa [29]. This assumption is supported by industry accounts which portray film selection as a process in which studios and independent producers have myriad projects in development at any given time and roles are continuously being offered to star actors and directors; as casting and directorial decisions are constantly in flux, stars typically negotiate with several studios at once [30]. Furthermore, studio choice is examined at points in time *conditional* on the fact that at least one studio made an offer.

[29]These opportunities might be films which the studio is developing and offers to the star, or projects that the star or a third party controls for which studio support is sought.

[30]See, for instance, Goldman [2000], or Bart [2000]

Based on the above assumptions, I model studio choice using the random utility framework of McFadden [1974] framework, which conditions on the fact that only one studio is chosen out of the seven possibilities for each film. The utility of star t from choosing studio $s \in \{1, \ldots, 7\}$ is $y^*_{ts} = \beta' x_{ts} + \epsilon_{ts}$, where x_{ts} consists of observable studio and star characteristics and ϵ_{ts} consists of unobservable factors which affect the star's utility.

Let $y_t = argmax(y^*_{t1}, \ldots, y^*_{t7})$. Then McFadden [1974] shows that if the errors ϵ_{ts} are independent and distributed with Weibull distribution $F(\epsilon_{ts}) = \exp(-e^{-\epsilon_{ts}})$, then the probability of star t choosing studio s is

$$Prob(y_t = s|x_t) = \frac{e^{\beta' X_{ts}}}{\sum_{r=1}^{7} e^{\beta' X_{tr}}} \tag{1}$$

I estimate the conditional logit model in equation 1 using a data set constructed using all films made by star directors or including star actors (stars are defined as any actor or director who have appeared on the Premiere 100 list in any year) with seven observations for each film representing the possible star-studio pairs. For star t, each "film" observation represents a time when the star is available and interested in taking on a new film project. Naturally, only one finished film is actually observed, and the potential films offered by other studios at the same time would differ from the one observed. The characteristics of the potential films offered by studios are likely to be the main drivers of the star's choice, but as these characteristics are unobservable, I can only control for characteristics of the studios and characteristics of past films involving the studio and star. Since films are highly individual projects involving unique combinations of cast, crew, and plotlines, the assumption that the unobserved film characteristics are independent is plausible.

The dependent variable corresponding to film f, star t, and studio s is 0 or 1, indicating whether studio s was selected for star t in film f. For each film f, X_{ts} contains characteristics of studio s in year τ as well as characteristics of the studio-star relationship in year τ, where τ is the year the film was released. The studio-specific independent variables in X are meant to control mainly for the amount of resources a studio has in a given year as well as possibly, the ability of the studio's managers. The studio-specific variables in X include studio revenues, number of films, and average budgets for films released in years τ and $\tau - 1$.

In addition to studio-specific characteristics, X contains controls for similarities between the types of films the studio and star make, using as proxies

the correlations in ratings and genres of the films made by the star and studio throughout the entire sample. To measure the impact of the star-studio relationship on studio choice, I use indicator variables for whether the star has worked for the studio in the past on any film and whether the star has worked for the studio in the past on an artistic film. For these variables, the temporal relationship between films is determined by release date. Alternate specifications include using variables counting the number of past films or the percentage of past films instead of an indicator variable. Other specifications use films released immediately before or after a given film to determine the studio-star relationship. The results are robust to using these alternate specifications instead.

Although I believe this simple model captures the essential aspects of studio choice by stars, the empirical setup is not without flaws. One complication is that in this data set, only the release date of the film is known, whereas the date of the deal between the star and studio is what matters for determining the factors which influence studio choice. The difference between the contract date and the film release can range from one year to over a decade, as films are written, filmed, and edited. However, if films released at the same time were produced at the same time, then contemporaneous measures of number of films released and average film budget would accurately reflect studio resources. While uncertainty in contract date introduces noise in the explanatory variables, I do not believe that the variance of the error is likely to be correlated with unobserved characteristics affecting studio choice. As a partial remedy to this issue, I add lagged values of the studio characteristics. Another potential issue with this setup is that while many films are proposed and enter various stages of production, only a few end up as finished films. If unobserved factors which relate to the probability that a film successfully completes production are correlated with X, then estimates of X could be biased. In addition, the empirical framework does not allow for the possibility that not all studios compete for all of the stars for every film. However, if a stronger studio-star relationship makes, then this also provides a channel through which the star brings value to the studio. Thus, my hypothesis may be extended to include the impact of studio-star relationships on film completion while retaining the fundamental idea of artistic films creating value by attracting human capital.

Table 16 presents the results of the conditional logit model for studio choice by directors. As would be expected, much of studio choice is driven by unobservable variables, and the R^2 values are only about 0.09. Directors

are more likely to choose studios with more films released contempaneously, where I interpret the number of films released as a proxy for studio resources. However, the odds ratio for lagged number of films released is not significant and very close to 1, indicating that measurement error in contract date between the director and studio may not be a substantial issue. Average studio budget is negatively correlated with the probability of studio choice, which is somewhat puzzling. The revenues and number of Oscar awards a studio attains are not significant in determining studio choice, indicating they may not be good proxies for the amount of resources a studio is able to offer to a director. The variables *Dir-stud genre corr* and *Dir-stud rating corr* indicate the correlations between the types of genres and ratings of directors and studios in the entire sample, and as would be expected, greater correlations lead to higher probability of a director choosing a studio. While the estimates are rather large, the coefficients on the director-studio correlations are not highly significant. The lack of significance may be due to the fact that these correlations are rather coarse measures of the similarity between the types of films favored by directors and studios, and also on the relatively films made by each director in his career.

The *Dir-stud past* variable indicates that the director has worked with the studio in the past, and the variable is highly significant with a coefficient around 2. This means that ceteris parabis, the odds of choosing a studio are twice as high if the director has worked with the studio in the past than if he hasn't. While the variables *Dir-stud sub past* and *Dir-stud Osc past* are not significant, they are greater than one, indicating that on average, they increase the probability of choosing a studio, which is consistent with my hypothesis. However, the coefficient of *Dir-stud Sun past* is below one, in contrast to my prediction.

Results on the studio-star variables are similar when considering studio choice by actors. Again, having worked previously with a studio in the past makes a star more likely to work with the studio again, as indicated by the *Act-stud past* variable. For actors, all three variables indicating previous artistic films with the same studio are above one, and both *Dir-stud sub past* and *Dir-stud Osc past* are highly significant. In order to utilize as much data as possible, the results in Tables 17 and 17 use all films which includes stars which appear on the Premiere 100 list in any year. While the significance decreases, the results are qualitatively unchanged when restricting the samples to films by stars which appear on the Premiere 100 list in the year of release.

	(1)	(2)	(3)	(4)
# films made by studio this year	1.235	1.234	1.233	1.234
	(7.40)***	(7.43)***	(7.39)***	(7.24)***
# films made by studio last year	0.991	0.991	0.988	0.990
	(0.32)	(0.34)	(0.43)	(0.35)
Total studio revenue this year	1.003	1.003	1.002	1.004
	(0.31)	(0.30)	(0.23)	(0.34)
Total studio revenue last year	0.991	0.991	0.991	0.991
	(0.83)	(0.87)	(0.84)	(0.84)
Total Oscars studio this year	1.003	1.003	1.003	1.003
	(0.17)	(0.19)	(0.20)	(0.15)
Total Oscars studio last year	1.004	1.003	1.005	1.004
	(0.21)	(0.19)	(0.27)	(0.22)
Avg budget studio this year	0.995	0.995	0.995	0.995
	(2.32)**	(2.26)**	(2.26)**	(2.32)**
Avg budget studio last year	0.995	0.994	0.995	0.995
	(2.04)**	(2.09)**	(2.01)**	(2.03)**
Dir-stud genre corr	16.355	17.788	20.451	15.145
	(1.90)*	(1.98)**	(2.27)**	(1.83)*
Dir-stud rating corr	18.487	15.414	17.587	20.141
	(1.70)*	(1.58)	(1.67)*	(1.74)*
Dir-stud past	2.401	2.287	2.378	2.484
	(5.69)***	(5.60)***	(5.71)***	(5.77)***
Dir-stud Osc past		1.451		
		(1.38)		
Dir-stud sub past			1.894	
			(1.04)	
Dir-stud Sun past				0.527
				(1.47)
Observations	3147	3147	3147	3147
Pseudo R-squared	0.09	0.09	0.09	0.09

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 16: Studio choice by directors. This table presents results of estimating a McFadden [1974] random utility model of studio choice by star directors between the seven major studios. The sample consists of all films directed by star directors (directors who have appeared on the Premiere 100 list in any year) in my data set. Seven observations are created for each film made by a star director corresponding to the seven studios, and the dependent variable is a 0 or 1 indicating which studio was chosen for that film's slot in the director's schedule. Independent variables include studio-specific variables indicating total studio revenue, Coefficients represent odds ratios, and robust standard errors are reported

	(1)	(2)	(3)	(4)
# films made by studio this year	1.008	1.007	1.009	1.008
	(1.15)	(1.11)	(1.36)	(1.16)
# films made by studio last year	0.990	0.990	0.990	0.990
	(1.34)	(1.34)	(1.40)	(1.34)
Total studio revenue this year	0.998	0.998	0.997	0.997
	(0.55)	(0.56)	(0.79)	(0.58)
Total studio revenue last year	0.998	0.998	0.998	0.998
	(0.30)	(0.33)	(0.44)	(0.31)
Total oscars studio this year	1.001	1.001	1.001	1.001
	(0.20)	(0.20)	(0.22)	(0.19)
Total oscars studio last year	0.992	0.992	0.993	0.992
	(1.08)	(1.09)	(0.94)	(1.06)
Avg budget studio this year	0.999	0.999	0.999	0.999
	(0.55)	(0.64)	(0.74)	(0.57)
Avg budget studio last year	0.998	0.997	0.997	0.998
	(1.40)	(1.51)	(1.53)	(1.41)
Act-stud genre corr	2.604	2.469	3.573	2.667
	(1.91)*	(1.81)*	(2.64)***	(1.97)**
Act-stud rating corr	0.817	0.896	0.786	0.801
	(0.53)	(0.28)	(0.62)	(0.58)
Act-stud past	1.514	1.405	1.462	1.496
	(4.23)***	(3.20)***	(3.89)***	(4.04)***
Act-stud Osc past		1.285		
		(3.36)***		
Act-stud sub past			1.829	
			(5.51)***	
Act-stud Sun past				1.157
				(1.08)
Observations	9560	9560	9560	9560
Pseudo R-squared	0.01	0.01	0.01	0.01

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 17: Studio choice by actors. This table presents results of estimating a McFadden [1974] random utility model of studio choice by star directors between the seven major studios. The sample consists of all films which include a star actor (actors who have appeared on the Premiere 100 list in any year) in my data set. Seven observations are created for each film made by a star actor (with duplicates if a film contains more than one star) corresponding to the seven studios, and the dependent variable is a 0 or 1 indicating which studio was chosen for that film's slot in the actor's schedule. Independent variables include studio-specific variables indicating total studio revenue, Coefficients represent odds ratios, and robust standard errors are reported

	(1) Mean/Sd	(2) % ret <= 1/2	(3) % ret>= 2	(4) %ret>= 5
All films	0.07	0.28	0.38	0.15
Large studio	0.35	0.20	0.43	0.15
Artistic subsidiary	0.20	0.34	0.36	0.18
Oscar nominated	0.68	0.04	0.65	0.40
Sundance	0.11	0.37	0.38	0.23

Table 18: Risk and return. The above table shows characteristics of the return proxy ret=world revenues / production budget. Column 1 shows the value of *ret* divided by the standard deviation of *ret* for different types of films. Column 2 shows the proportion of each type of film which have returns of less than 1/2, and columns 3 and 4 show the proportion of each type of film which have returns of greater than 2 and 5, respectively.

4.3 Risk and Return

One alternative hypothesis is studios may make artistic films because while they are less profitable on average than commercial films, they may have a more favorable risk profile. Table 18 shows characteristics of the return proxy consisting of the ratio between worldwide revenue and production budget minus 1. The first column shows the ratio of return to the standard deviation of return and shows that Oscar-nominated films have the highest ratio, followed by large-studio films. In this respect, Oscar nominations are not a good way to classify artistic films, since they identify films which are ex-post successful. Thus, it is no surprise that these films have very high return-risk ratios. However, subsidiary and Sundance films have ratios lower than those of large-studio films, contrary to the risk hypothesis. Columns 2-4 of Table 18 show the proportion of films in each category which are in the left or right tails of the return distribution. As shown, subsidiary and Sundance films have both larger left tails and smaller right tailes than large-studio films, further contradicting the risk hypothesis.

5 Conclusion

My results indicate that artistic films seem to be less favorable investments than commercial films. Artistic films are more likely to have characteristics

which are associated with lower revenues, and they also make less revenue on average when controlling for film characteristics and budgets. These results lead naturally to a question of why studios choose to make artistic films. I assert that the answer lies in the creative human capital that are essential to film production. Revenue regressions show that star actors and directors significantly increase film revenues, but these stars are rare and wield significant bargaining power, so studios must compete to attract them. While high salaries are one method of attracting talent, this method reduces profits for firms while leaving none of them with a competitive advantage. However, anecdotal evidence shows that stars greatly value the creative freedom of working on artistic films, and since studios are likely able to provide artistic projects much more cheaply and easily than stars themselves, they may be an efficient way to attract talent. Moreover, since a star may be interested in a specific artistic project, this gives the studio developing the project particular leverage for obtaining the star's participation in future projects. Consistent with this hypothesis, analysis on studio choice by stars shows that artistic films positively influence studio choice. Thus, in an environment where stars are free agents and studios must compete for the top talent, artistic films may be a form of non-pecuniary compensation or perk for attracting talent. This line of reasoning may motivate a broader argument for why firms which rely heavily on human talent may find it beneficial give employees significant creative freedom, even if they choose to work on projects which are less profitable. Already, firms such as Google Inc., AES Corporation, and 3M allow employees to spend significant amounts of their time working on personal projects unrelated to their primary assignments. As companies such as these have come to realize, creative freedom is essential to attracting talent in human-capital-driven companies.

References

P. Aghion and P. Bolton. An Incomplete Contracts Approach to Financial Contracting. *The Review of Economic Studies*, 59(3):473–494, 1992.

P. Bart. *The Gross: The Hits, the Flops: The Summer That Ate Hollywood*. St. Martin's Press, 2000.

P. Biskind. *Down and Dirty Pictures: Miramax, Sundance, and the Rise of Independent Film*. Simon & Schuster, 2004.

A. De Vany and W.D. Walls. Uncertainty in the Movie Industry: Does Star Power Reduce the Terror of the Box Office? *Journal of Cultural Economics*, 23(4):285–318, 1999.

A. De Vany and W.D. Walls. Does Hollywood Make Too Many R-Rated Movies? Risk, Stochastic Dominance, and the Illusion of Expectation. *The Journal of Business*, 75(3):425–451, 2002a.

A. De Vany and W.D. Walls. Movie Stars, Big Budgets, and Wide Releases: Empirical Analysis of the Blockbuster Strategy. Technical report, Working paper, UC Irvine, 2002b.

A.S. De Vany. *Hollywood Economics*. Routledge, 2004.

P. Drucker. Beyond the Information Revolution. *The Atlantic Monthly*, 284 (4):47–57, 1999.

P.F. Drucker. Management's new paradigms. *Forbes*, 162(7):152–177, 1998.

S. Dubner and S. Levitt. A Star is Born. *The New York Times Magazine*, May 7, 2006.

A. Elseberse. The Power of Stars: Creative Talent and The Success OF Entertainment Products. Technical report, working paper, Harvard Business School, 2006.

E. J. Epstein. The Oscar Deception. *Slate*, February 22, 2006. URL `http://www.slate.com/id/2136723/`.

K.A. Ericsson. *The Cambridge Handbook of Expertise and Expert Performance*. Cambridge University Press, 2006.

C.E. Fee. The Costs of Outside Equity Control: Evidence from Motion Picture Financing Decisions. *The Journal of Business*, 75(4):681–711, 2002.

R. Florida. The Rise ofthe Creative Class, 2002.

J. Friedman. Nice movie opening, but did you beat the forecasts? *Los Angeles Times*, June 6, 2006.

J. Gertner. Funny Money. *New York Times Magazine*, November 12, 2006.

W. Goldman. *The Big Picture: Who Killed Hollywood? and Other Essays*. Applause, 2000.

K. John, S.A. Ravid, and J. Sunder. The Role of Termination in Employment Contracts: Theory and Evidence from Film Directors Careers. Technical report, working paper, Stern School of Business, New York University, 2002.

J. Lippman. Hollywood Report: The New Scorekeepers -Web Sites Play to New View Of Movies as Data Game. *The Wall Street Journal*, June 24, 2005.

B.R. Litman and L.S. Kohl. Predicting Financial Success of Motion Pictures: The'80s Experience. *Journal of Media Economics*, 2(2):35–50, 1989.

T.W. Malone. *The Future of Work: How the New Order of Business Will Shape Your Organization, Your Management Style, and Your Life*. Harvard Business School Press, 2004.

Colin McCabe. Interview with Peter Biskind, August 20, 2004. URL `http://www.bfi.org.uk/features/interviews/biskind.htmlindependent`.

D. McFadden. Conditional logit analysis of qualitative choice behavior, in Frontiers in Econometrics(P. Zarembka, Ed.), 1974.

F.M.S. Morton and J.M. Podolny. *Love Or Money?: The Effects of Owner Motivation in the California Wine Industry*. National Bureau of Economic Research Cambridge, Mass., USA, 1998.

R.G. Rajan and J. Wulf. Are perks purely managerial excess?$. *Journal of Financial Economics*, 79:1–33, 2006.

S.A. Ravid. Information, Blockbusters, and Stars: A Study of the Film Industry. *The Journal of Business*, 72(4):463–492, 1999.

S.A. Ravid and S. Basuroy. Managerial Objectives, the R-Rating Puzzle, and the Production of Violent Films. *Journal of Business*, 77(2):155–192, 2004.

A. Thompson. *The Hollywood Reporter*, July 1, 2005.

Table 19: Appendix A:Studios and subsidiaries. The table shows the seven major studios and their subsidiaries, with artistic subsidiaries marked by an asterix. Between 1980 and 2005, some of the subsidiaries changed hands. In particular, American International Films, Filmways, Orion Pictures, and Orion Pictures Classics were owned by Warner Bros. from 1980 until 1989 and by MGM staring in 1997. When ownership changes occur, films released during the year of the change are attributed to the previous owner, and films released starting the year after the change are attributed to the new owner. Thus, the 2005 acquisition of MGM by Sony does not affect my sample.

Studio	Subsidiaries
Disney	Buena Vista
	Caravan Pictures
	Dimension
	Hollywood Pictures
	Miramax *
	Touchstone Pictures
Universal	Focus Features *
	Good Machine *
	Gramercy *
	October
	October Classics *
	Polygram
	Rogue Pictures
	USA Films *
20th Century Fox	Blue Sky
	Fox Intl Classics *
	Fox Searchlight *
Sony	American International Pictures
	Columbia
	Filmways
	MGM
	Orion Classics *
	Orion Pictures
	Samuel Goldwyn *
	Screen gems
	Sony Classics *
	Sony Repertory *
	TriStar
	United Artists
Warner Bros.	Castle Rock
	Fine Line *
	New Line
	Warner Independent *
Paramount	Paramount Classics *
	Republic

Table 20: Appendix B: Variable descriptions

Variable Name	Description
G PG PG-13 R	Dummy variables for MPAA Ratings
Action Adventure Animation Biography Comedy Crime Documentary Drama Family Fantasy Horror Music Mystery Romance Scifi Thriller War	Dummy variables for IMDB genre (each film can have multiple genres)
Log revenue	Log of worldwide revenue adjusted for inflation to 2004 dollars
Log budget	Log of budget in millions adjusted for inflation to 2004 dollars
Runtime	Movie length in hours
Sequel	Dummy variable for sequels and franchise films

Table 21: Appendix C: Stars with positive and significant fixed effects in revenues regressions. Stars are listed in descending order of the magnitude of the fixed effect, and significance is determined at the 10% level.

Directors	Actors
John McTiernan	Arnold Schwarzenegger
Doug Liman	Michelle Pfeiffer
Andy and Larry Wachowski	Matt Damon
Rob Cohen	The Rock
Wolfgang Petersen	Jack Black
Brett Ratner	Steve Martin
Tom Shadyac	Harrison Ford
Ang Lee	Robert DeNiro
Tom Hanks	Robert Redford
David and Jerry Zucker	Nicole Kidman
John Singleton	Meg Ryan
Stephen Spielberg	Keanu Reeves
Quentin Tarantino	Eddie Murphy
Robert DeNiro	Jodie Foster
Ivan Reitman	Johnny Depp
Garry Marshall	John Travolta
Robert Zemeckis	Vin Diesel
Paul Verhoeven	Julia Roberts
Roland Emmerich	Tommy Lee Jones
Catherine Hardwicke	Vince Vaughn
David Fincher	Sandra Bullock
George Lucas	Steven Seagal
Chris Columbus	Ben Affleck
Martin Lawrence	Will Smith
Gore Verbinski	Keira Knightley
Christopher Nolan	Nicolas Cage
Rob Marshall	Denzel Washington
Stephen Daldry	Martin Lawrence
Mel Gibson	Daniel Day-Lewis
Tyler Perry	Halle Berry
Sam Mendes	Will Ferrell
	Jim Carrey
	Cameron Diaz
	Adam Sandler
	Tom Hanks
	Tom Cruise
	Woody Allen
	Lindsay Lohan
	Michael Douglas