

# THE ECONOMICS OF MOVIES: A LITERATURE SURVEY

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**Abstract.** The film industry provides a myriad of interesting problems for economic contemplation. From the initial concept of an idea through production, distribution and finally exhibition there are many aspects to the film project and the film industry that present new and interesting puzzles worthy of investigation. Add to this the high level of data availability, and it is little wonder that an increasing number of researchers are being attracted to this industry. To date, however, there are no comprehensive surveys on the contribution of economists to this literature. This paper attempts to fill this void and unify what is known about the industry. It also identifies and discusses potential areas for new research.

**Keywords.** Motion picture industry; Motion pictures

## 1. Introduction

Over the last two decades the motion picture industry has generated a growing collection of academic research. The complexity of the production process, the unique features of distribution and exhibition, and the uncertain nature of demand provides researchers many interesting problems worthy of investigation. Add to this the fact that there are many rich data sources available (some highly accessible, others less so) and it is little wonder applied researchers are being increasingly attracted to this industry.

This paper endeavours to provide a comprehensive and up-to-date survey of the literature which has emerged on economic issues related to motion pictures and the motion picture industry. To date there have been a number of number of very good books, book sections and at least one journal article that have both explained and surveyed the literature on the industry. For example, books such as Litman (1998), Caves (2000), Squire (2003) and Vogel (2007) provide detailed description and analysis of the industry – often with contributions from respected industry experts and professionals. Books which have assembled series of academic papers on economic/marketing issues relevant to the industry include De Vany (2004) and Moul (2005). As well there have been a number of survey type articles within broader volumes such as Chisholm (2003) in *A Handbook of Cultural Economics* (Towse, ed.), De Vany (2006) in *Handbook of the Economics of Art and Culture* (Ginsburgh and Throsby, eds) and Walls (2008a) in *The New Palgrave Dictionary of Economics* (Durlauf and Blume, eds). In the context of journal surveys related to the industry, the study Eliashberg *et al.* (2006) provides a comprehensive synthesis of the marketing literature also with discussion of a number of studies more oriented towards economists' interests.<sup>1</sup>

Although much literature is referenced within the collection of works just cited, most of it applies outside the usual domain of economic academia and the 'surveys' between them cover only a relatively small amount of the rapidly expanding body of scholarly research written about the industry.<sup>2</sup> This survey throws a wider net and assembles a significantly larger collection of published research which

is inherently economic in focus. This also implies the study refrains from discussing (in detail) other disciplines' research efforts of recent years.<sup>3</sup> The main goals of this survey are therefore to bring together a large volume of economic research specifically written about the motion picture industry, and to do so in a structured and coherent way such that those new, or even familiar, with the literature of this area may have a useful source of referral.

This study is organized as follows. Section 2 provides a brief overview of the industry's history and related literature in relation to the studio era and the historic anti-trust cases of the late 1940s and early 1950s. Section 3 is the most extensive section and details literature which can be broadly categorized as 'microeconomic' with respect to individual film demand (including a discussion of the role of stars, reviews, awards, ratings and genre), production, distribution and exhibition. Section 4 surveys research with a more 'macroeconomic' focus where, for example, aggregate patterns of cinema attendance (rather than individual film attendance) is the unit of analysis. Finally, Section 5 provides a concluding discussion and identifies some directions for future research.

## 2. Some History<sup>4</sup>

The history of the motion picture industry goes back to Edison's invention of the kinetograph (motion picture camera) and kinoscope (viewing machine) in 1894. Within a decade or so projectors were developed and short 'one-reel' films had begun screening at 'nickelodeon' theatres – known as such because of admission costing a nickel. These silent one-reel films had very simple storylines and a night at the nickelodeon typically included a selection of one-reel films of different genres and newsreels. Through the early 1910s, two-reel films replaced one-reel films, which were subsequently replaced by feature length films. By the late 1920s films had sound and were popularly referred to as 'talkies'. Studios (many which are the same as today) had also begun operations and were operating their own 'deluxe' theatres in a number of major cities. In 1933, after the Great Depression, the 'Code of Fair Conduct' was drawn up by the Motion Picture Producers and Distributors of America which allowed a number of economic stabilization practices including block-booking, blind-selling, time clearances, zoning and admission price discrimination. Only 2 years later, however, the explicit nature of these practices was banned, yet tacitly they remained in place.

During the late 1930s five of the major studios were accused of deliberately attempting to eliminate the remaining independents from the industry by tactics such as price fixing and restricting supply. This led to a series of Department of Justice antitrust actions that ultimately led the Supreme Court to radically change the structure and practices of the industry in 1948 through the *Paramount Antitrust* and consent decrees in which the studio/distributors were ordered to divest of their cinema interests and change a number of their business practices. The courts banned integration between distribution and exhibition and banned terms in contracts which implied integration. The courts also banned certain methods for allocating films including block-booking and blind-selling, requiring features to be licensed individually, one theatre at a time, to a wider group of exhibitors. Long-term relationships, franchises, multiple-film licences and admission price fixing were also forbidden. The courts concluded that the vertically integrated structure of the industry did not fit the reigning theory of competition.

Numerous scholars have discussed the appropriateness of the courts' decisions since this time. In particular, the case study of De Vany and Eckert (1991) provides an insightful and detailed analysis of the courts' rulings in light of economic theory.<sup>5</sup> These authors argue against the courts' decisions, posing that the industry's structure and its licensing practices were reasonable ways for dealing with the problems that arose from four characteristics of the industry's product: (1) each motion picture is unique and cannot be duplicated, (2) demand is unpredictable, (3) a motion picture needs time on the screen to build an audience, and (4) most of the costs of production and distribution occur before a film can be shown and are sunk. These characteristics, they argue, determined how the industry was

organized at the time of Paramount, where the biggest studios integrated production, distribution and exhibition under one authority.

Kenney and Klein (1983) also examine an aspect of the Paramount cases in relation to the practice of block-booking – i.e. licensing several films as a bundle at an average price. Rather than being merely a subtle form of price discrimination, they contend that block-booking was designed to fix an over-searching problem that resulted from initial box office revenue information being revealed between the signing of a contract and the time when the distributor received and had to pay for the film. In their analysis, they also examine the related practice of blind-selling (where exhibitors do not view the film before they purchase it) which, they argue, was used to save on inventory costs but led to the *ex post* opportunistic behaviour of exhibitors and that block-booking was a way of dealing with this problem.

Using data on Warner Bros. from 1937 to 1938 of all first run, second run and third run theatres in Wisconsin, Hanssen (2000) proposes that, rather than Kenney and Klein's (1983) over-searching contention, block-booking was used simply to supply greater quantity which exhibitors were demanding given that there was ample evidence of exhibitors still rejecting certain titles under blocking arrangements. But while acknowledging this observation as true, in rebuttal Kenney and Klein (2000) add to their earlier arguments by stressing the role of 'reputational capital' of the distributor being important in enforcing contractual flexibility, i.e. a reputation for providing films of an acceptable quality. They explain block-booking within this framework by its effects on reducing the variance in the value of the film package and, therefore, the demands placed on the distributors' reputational capital.

In a study with particularly rich data, Blumenthal (1988) provides a useful empirical examination of blind-selling – a practice which, although banned by the US Supreme Court 1948, eventually re-emerged in the industry. Using actual contract data, she describes an auction framework where exhibitors are blind (i.e. have constrained information) and proposes an error components model to investigate a data set which includes the terms and experiences of 18 films licensed to a national circuit by three major distributors in the USA from January to September 1982. The empirical component of her study considers the exhibitors bid and returns (separately) as functions of cinema density, contractual house-nut, production budget, number of simultaneous film openings and (of most importance to her study) a dummy variable of whether or not the auction was blind. Her results show that blind exhibitors reduce their bids (implying they increase their mean returns); however, in doing so they assume more variance as a result. Overall though, the increase in mean does not offset the increased variance and exhibitors suffer a loss of expected utility as a result, which may in turn explain the increased legislative actions initiated by exhibitors.

Other researchers considering the historical aspects of the industry have compared the demand conditions and overall profitability of the industry in the pre-Paramount era to that of today. Building on some of their earlier work,<sup>6</sup> Pokorny and Sedgwick (2010) examine the profit trends in Hollywood using data from the 1930s and 1990s. The 1930s data they examine are actual studio ledger data from MGM, RKO and Warner Bros. covering 1796 films, whereas the data from the 1990s is standard Nielsen EDI covering 2116 films. These authors develop a measure of profit which includes actual rental incomes, distribution costs and production costs in the 1930s sample. They also compensate for ancillary revenues in the 1990s sample by apportioning theatrical's share of costs to profits to provide a comparable measure with the 1930s sample – although these are estimated from averages reported by Vogel (2007) which somewhat weakens the analysis in relation to their rich 1930s data. Their results show that similar levels of variability existed in both periods, but in the 1930s the main source of profits were from low to medium budget films, whereas in 1990s it was high budget films that generated the higher proportion of revenues. For example, they show that films costing three times the annual average accounted for about 14% of production budgets during both periods, but in the 1930s generated about 3.6% of total profits whereas in the 1990s this proportion was almost 20% – providing some evidence of increasing returns to production budget spending. They interpret (increasingly) high

budgets in the 1930s as experimental and even ‘vanity projects’, but also note that institutional features (such as short runs) might have played a role. Their results support that notion that while individual film performance is unpredictable, the portfolio approach and learning which types of films to invest in has helped to maintain Hollywood’s edge.

### 3. Movie Microeconomics

Much like general microeconomics, movie microeconomics deals broadly with problems related to an individual entity such as the film project itself, the individuals/institutions associated with the film project, or the deals done in relation to the film project, rather than problems more relevant to the industry at an aggregate level. As such this section focuses firstly on the demand for individual films, where it is impossible to proceed without discussion of the uncertainty inherent in understanding demand, and includes discussion of the role that stars, critics, awards, ratings and genres have on demand. Although the various studies discussed are structured around these sub-headings, it is an inherently subjective exercise to the group research this way and the headings are intended to serve merely as a guide and not a definitive classification as often studies transcend these categorizations. With this in mind, the following sub-sections on ‘Production’, ‘Distribution’ and ‘Exhibition’ also have some degree of subjectiveness in their classification – obviously grouping in this way is an intuitively appealing way in which to describe the various stages of film development to final consumption, even if the research lines are sometimes blurred.

#### 3.1 *Demand and Uncertainty*

Many empirical papers are now accumulating which deal broadly with the demand for individual films. Without suggesting that these research efforts are not establishing original and informative results, the common approach of a number of these empirical studies is to model individual film revenue (or attendance) as a function of a set of film specific explanatory variables which may include budget, screen counts, advertising, awards, reviews, star power, genre, ratings etc. among other variables. Although statistically significant and intuitive results are frequently observed, there is a growing realization that the specification of such models requires special attention due to complications such as heavy tailed revenue distributions, and potentially endogenous right hand side variables.

Prag and Casavant (1994) were some earliest researches to investigate the determinants of box office revenues using a number of the explanatory variables similar to those mentioned above. Their data set covers a sample 652 films released in the US market over a large number of years. The covariates they consider include budget, quality (critical reviews), star, sequel, award, genre and rating. In addition, they investigate a sub-sample of 195 titles for which they also observe advertising data. Their regression results reveal positive effects of budget, quality, star, sequel and award, but when advertising is included only quality remains significant. Subsequently they examine the determinants of marketing expenditure using the explanatory variables of budget, quality, star, sequel, award, genre and rating. They observe (positive) significance on budget, star, award and genres of action and comedy, and argue that it is not surprising that some variables lose significance when prints and advertising were added given that star, awards and budgets all impact on revenue indirectly through advertising. Although not directly stated by these authors, their results highlight strongly the endogenous nature of the advertising variable (i.e. box office revenue films are likely to be associated with higher of advertising) as well as the difficulties with interpreting coefficients with collinear independent variables – for example, budget and advertising are typically highly correlated.

A more recent study to examine and econometrically account for the subtle intricacies of demand (and supply) in relation to film covariates is Elberse and Eliashberg (2003) who use weekly revenue

and screen data on the USA, France, Germany, Spain and the UK in a simultaneous equation model of demand and supply dynamics. Their data set includes 164 titles which were released in 1999 and featured at least once in the top 25 of the US charts. They model weekly revenue as function of screens that week and other time variant and (for the first week only) time invariant variables. The time variant variables include word-of-mouth (weekly screen average), competing films and season, whereas time invariant variables include star appeal, director appeal and advertising expenditure. On the supply side they model weekly screen allocation decisions as a function of expected revenue for that week. They use Hollywood Stock Exchange (HSX) price data as a week one proxy for expected revenue, and in subsequent weeks use an exponential smoothing procedure in which last week's anticipated value is updated by a fraction of the prediction error. Their supply model also includes time variant and time invariant variables similar to those of the demand model and, in the case of foreign markets, also a release time-lag variable from the US market. The results show evidence that several variables, usually assumed to influence revenues directly, influence revenues through the allocation of screens (e.g. advertising). For all markets, screens are the main determinant of revenues, and expected revenues are the main determinants of screens. They also show that advertising is the main predictor of opening week screens and revenues, and word-of-mouth is important subsequent weeks. Another finding is of an inverse relationship between the domestic-to-foreign release time-lag and foreign box office revenues – suggesting that word-of-mouth momentum may run out if distributors delay a release for too long between the two markets.

An interesting feature of motion picture demand is the way in which consumers' interact and the resulting effect on patterns of box office revenues. In a series of papers De Vany and Walls (1996, 1997, 1999, 2004) extensively explore the dynamics of demand, the resulting statistical distributions of revenues/profits, and the implications for the practices of the industry.<sup>7</sup> De Vany and Walls (1996) investigate the information cascade effects caused by word-of-mouth interactions about a particular film. Using a sample of 300 films from *Variety's* top 50 released 1985–1986, they liken the information cascade effects to the Bose–Einstein model of physics where information feedback has the potential to generate extreme box office 'hits' and 'flops'. Their model shows that the revenue distribution evolves recursively over the run of the film as a mixture of opening and stochastic competition between films. They show that the resulting distribution has heavier tails than the log-normal distribution and, further, that it violates an exact form of the Pareto law implying an auto-correlated pattern in the growth of revenues which they interpret as 'increasing returns to information'.<sup>8</sup>

In subsequent research, De Vany and Walls (1997) investigate the number of weeks spent in *Variety's* top 50 for a sample of 350 films released between 1985 and 1986. They model the duration using a Weibull survival model in relation to a vector of explanatory variables including first run bookings, the week's revenue, the number of weeks already in top 50, the rank in top 50, and the number of showcases a film played in when it debuted. Although all are shown to be statistically significant, they declare only first runs to be economically significant to the magnitude of increasing a run by 11.3% for a 1% increase in first runs. Walls (1998) also utilizes a Weibull survival model on a sample of 493 films that played in the Hong Kong market between 1994 and 1996. Using the number of weeks spent in *Variety's* top 10, he considers the role of opening week revenues and whether the film was in Chinese or English and finds opening week revenue positively impacts on life-length whereas Chinese films generally enjoy a shorter life at the Hong Kong box office.

De Vany and Walls (1999) again consider the mathematical properties of box office revenue (and estimated profit) data of 2015 motion pictures released between 1985 and 1996. They show that the revenues are Levy stable distributed with extreme skew and theoretically infinite variance. They argue there is no typical movie because box office revenue outcomes diverge over all values. In reaching this finding they evaluate the impact of budget, star power (actors and director), sequels, genre, rating and release year on 'hit' probability in a binary dependent variable framework, where a hit is defined as a movie grossing over US\$50 million. They find it impossible to attribute the success of a movie to

individual causal factors showing that the audience reception (captured by a dummy variable for films lasting greater than 10 weeks) is the most important variable in determining box office revenues.

Utilizing the same data as De Vany and Walls (1999), De Vany and Walls (2004) show the stable Paretian distribution to provide a strong account of (unconditional) profits in the industry, extending their earlier findings relating to revenues. They find support for the 'nobody knows anything' principle as evidenced by the (theoretic) infinite variance of the profit distribution – a property of the stable Paretian distribution. They also note statistical evidence consistent with what they term the 'angel's nightmare', which is observed when excess over a film's budget leads to a final cost that is proportional to the cost already expended. Further, they show support for the 'curse of the superstar' which is a consequence of the skew of the profit distribution for films with stars, which translated implies that if a star is paid their expected profit, the movie will generally lose money.

Collins *et al.* (2002) also examine the statistical revenue distribution of a sample of 216 films released in the UK 1998–1999 and similarly show that film revenues in their sample are characterized by unbounded variance. Following the research of De Vany and Walls (1999) they investigate the tail parameter of the revenue distribution using regression techniques, Hill plots and the stable distribution (quantile) estimators. They find differing values of the tail weight parameter using the different techniques, but are able to establish that the distribution is characterized by theoretically infinite variance. Owing to the non-normal revenue distribution, they subsequently employ a binary dependent variable logit model on four revenue threshold levels to show that star power and good reviews help success, but the impact is far from certain as represented by large standard errors of the estimated parameters.

Building on his earlier work with De Vany, Walls (2005a) applies a skew-normal and skew- $t$  model to modelling a sample of 1989 films released in the USA between 1985 and 1996. His basic regression structure models revenue as a function of budget, star power, sequel, opening screens, genre and rating where the disturbance term follows a (log) skew-normal, or (log) skew- $t$  distribution. He compares the results to standard log-linear and minimum absolute deviation models. The statistical evidence rejects the log-normal model and shows that coefficients differ significantly between the two sets of specifications – in particular, the effect of opening week screens is less in the skew-normal and skew- $t$  models. He also argues that the skew- $t$  is intuitively (more) appealing because it not only includes skew but heavy tails, and is a good practical approximation to the asymmetric stable regression.

Using the same data and in a similar contextual framework to Walls (2005a), Walls (2005b) uses the symmetric stable distribution to account for heavy tails of the revenue distribution in a regression framework. He also applies a robust bounded influence regression (which gives less weight to outliers) and a trimmed least squares procedure (which omits the top and bottom 5% of observations) for comparison and observes that coefficient of budget and star are statistically different between the least squares model and the stable model, but not opening week screens or sequel. The estimates also reveal that the impact of a star is higher in the ordinary least squares (OLS) model implying that, if they were to be paid their true value, the film would lose money. As a practical point, he notes that the bounded influence regression provides a useful approximation to the stable regression but the trimmed least squares may perform poorly because it cuts out observations which actually should be included as they are not actually residual outliers.

Walls (2005c) revisits the rank-revenue model of De Vany and Walls (1996) and shows that a stretched exponential (Weibull) does a better job of fitting the data than the parabolic power law originally presented using the same data described above. The stretched exponential models revenue, raised to a power, against log rank, where the power parameter has the practical interpretation of amount that the empirical distribution's argument is 'powered-up' before it is exponentiated. This is consistent with a model of consumer demand where shocks are multiplicative and there is (eventual) saturation in demand.

In one of the recent number of papers pursuing a discrete choice approach to modelling movie demand, Moul (2007) also investigates the word-of-mouth effect and saturation consequences on demand using a nested logit model where word-of-mouth presents through the heteroskedasticity and serial correlation in the error term of the model. His panel data set covers 1602 titles reported in *Variety's* weekly top 50 from 1990 to 1996. The results of his thoughtful analysis suggest that word-of-mouth represents approximately 10% of variation in consumer expectations and that information appears to reach the average consumer quickly. He also identifies that movies with low expectations find it harder to capitalize on word-of-mouth than movies with high expectations

Using data on the Australian industry, McKenzie (2008, 2009) provides evidence on word-of-mouth and the interaction of demand and supply at the national level. Presenting a model similar to that of De Vany and Walls (1996), McKenzie (2008) provides evidence that the box office revenue distribution is characterized by thick right tails that are more extreme than a log-normal distribution and have theoretically infinite variance. Using a sample of 2429 films, he observes this not only for the entire sample, but also for a number of sub-samples disaggregated by opening week number of screens. Further, he shows that weekly screen average revenue distributions similarly reject log-normality, have theoretically infinite variance, and that the probability mass in the (right) tail of the weekly screen average distribution increases until week six and then decreases. He explains this finding as a consequence of word-of-mouth effects where consumers share information about films they like over early weeks and a bifurcation effect begins since films are contractually obligated to theatres for the minimum run period. Once this period ends, however, poor performing films are dropped and there is less divergence across the distribution and as a result there is less probability mass in the right tail.

McKenzie (2009) employs a survival analysis (with unobserved heterogeneity) to investigate word-of-mouth with respect to the number of weeks in which a film plays in the weekly Australian box office charts. His analysis considers a number of film specific covariates relating to the production characteristics of the film (budget, star power, re-release, sequel, genre and rating), consumer signals (US revenue and critical reviews), and strategic distribution variables (previewing, advertising, opening week screens, and release gap with the US market). Using data on 360 wide-release films released over the years 2000–2005, he provides evidence that box office life-length responds to previewing, advertising, critical reviews and US box office – but not to production budget, star power or opening week screens.

### 3.1.1 *The Role of Stars*

Stars are a long-standing feature of the movie business and the top ones command large salaries. Empirical researchers commonly include a 'star' variable, among others, in their attempts to explain box office success. Quantifying a star's impact, however, is an inherently subjective exercise and there have been many different approaches adopted from examining the actor's box office history, their award history, or appearances on industry 'power' or 'hit' lists (of which there are a number) among other methods. Rather than discuss how different researchers have measured star power, however, this section focuses on 'how' and 'why' stars play such an important role in the movie business.

Albert (1998) examines the role of stars and argues that although stars are important, particularly in getting a film financed, they by no means guarantee success. His model suggests that stars are important not only because they attract a group of fans, but because they are least noisy and most consistent 'marker' for successful films. As an example he suggests that the actor Clint Eastwood, either through talent, ability to choose or ability to acquire investment, is a marker of successful films which can then be characterized as a film type. The theoretical context of his model is based on the famous Yule–Simon skew distribution, which is also related to the De Vany and Walls (1996) model

of revenue dynamics.<sup>9</sup> His analysis considers the top 20 films released between 1969 and 1995 over which time 283 different ‘film types’ (actors) are observed. Of these 155 had one such film, 52 had two such films, 22 had 3 etc. and 1 had 19 such films (Clint Eastwood). The results suggest that to produce a successful film it is best to produce a film of a type that has success already attached to it (marker) – i.e. to hire a star that has been associated with a string of successful films.

Bagella and Becchetti (1999) analyse the determinants of successful Italian movies produced between 1985 and 1996 covering a sample of 977 films and examine how the interaction of star actors and star directors may contribute towards film success. Using GMM-HAC (generalized method of moments heteroskedasticity and autocorrelation consistent) and quantile regression structures to account for the skewed nature of total admissions (their dependent variable), they consider a range of explanatory variables relating to the (*ex ante*) popularity of director and cast, subsidization, age restrictions, foreign co-productions, GDP, ticket prices, genre and film production house. Using measures of director and cast appeal derived from survey analysis, they find a quadratic specification with interaction between director and cast appeal provides evidence of positive externalities between the two factors – i.e. in addition to their individual effects there is an effect on revenue which exceeds the sum of the individual contributions. They also find no evidence of subsidization, foreign co-production, changing ticket prices, changing GDP or age restrictions affecting attendance, but do note the ‘comic’ genre and the ‘Filmauro’ production house as having a significant impact on admissions.

Ravid (1999) investigates reasons for employing a star in relation to two hypotheses: (1) ‘rent capture’, i.e. they are paid the expected value of their contribution, and (2) ‘signalling’ that a film is of higher quality based on the assumption of a risk averse studio executive, or a film maker, with superior information about increased chances of success. His data set covers a sample of 175 films released between 1991 and 1993. The primary dependent variables are domestic (US) revenue, rate-of-return (revenue/budget, i.e. profitability), international revenue and video revenue. The ‘star’ variables he considers are whether or not any lead actors had won an Academy Award, whether or not any of the lead actors had participated in a top 10 grossing film in the last year, whether or not any of the lead actors had been nominated for an award, the number of awards/nominations and also an ‘unknown’ variable if none of the cast members appeared in any of three major movie reference guides. His results show that star studded films bring in additional revenues in mean comparison tests, but when considered in a multivariate regression star impact has no discernible impact, thus cannot support the signalling hypothesis. Further, the impact of budget appears significant suggesting that spending of any sort, in general, increases revenues. He also shows that star appeal has no impact on rate-of-return, both in mean comparison tests and in regression analysis implying non-rejection of the rent capture hypothesis (i.e. budget and revenue increase proportionally).

Elberse (2007) has examined the contributions of stars to movie success using the online fantasy HSX market as her primary data source. Using data on 1200 casting decisions (covering approximately 600 actors and 500 movies) combined with ‘Movie-Stock’ and ‘Star-Bond’ data from the HSX she uses an event study framework to compare movies’ expected performance before and after a casting announcement. Her findings suggest that enlisting (delisting) a star causes the average HSX price to increase (decrease) by about H\$3, which translates to a gain (loss) of approximately US\$3m in expected box office revenue over the first 4 weeks of a film’s run. She also investigates the magnitude of the individual casting announcements on the HSX price in relation to a number of explanatory variables including the star’s economic (box office) and artistic (nominations/awards) history, the economic/artistic history of the supporting cast as well as interactions of the star with cast. She finds that the star’s prior performance in both an economic and artistic sense is a significantly important determinant and also that the number of prior performances of other cast members positively affects the size of the HSX response. She also investigates whether stars have any impact on the net worth, or valuation, of the specific film studio they represent but finds no evidence of any value-adding supporting the idea that stars capture their rents.

### 3.1.2 *The Role of Critics and Reviews*

Professional certifiers play an important role in many industries, and this is certainly true in the motion picture industry. In the USA, for example, there is evidence that one-third of moviegoers seek out the advice of a professional critic before going to the cinema and that one in three chooses a film because of a favourable review.<sup>10</sup> In a contribution that generated a series of related papers, Eliashberg and Shugan (1997) consider the role of the critic as an ‘influencer’, whose reviews have causality effects of increased patronage, versus ‘predictor’, whose reviews serve merely as indicator of what films audiences will enjoy and patronize. The methodological framework they present is that the influencer’s reviews should correlate more with early box office revenues (under the assumption that this effect would die out in later weeks), against the role of a predictor whose reviews should correlate more with later box office and/or cumulative revenues. They use US data from 1991 to 1992 on weekly revenues, and review data from *Variety* which classified reviews as ‘pro’, ‘con’ or ‘mixed’. In total their data set covers 2104 reviews for 172 movies. They find support for the predictor perspective given that the effect of positive reviews appears stronger at later weeks of a film’s run, but they do stress some caution of their results given the difficulty in disentangling correlation from causality.

Basuroy *et al.* (2003) also investigate the role of critics as influencer or predictor. Using primarily the same data as Ravid (1999) – augmented with data on average nature of review (according to *Variety*’s pro, mixed and con assessment), the proportion of good reviews, the number of reviews and variance of the reviews – they investigate a sample of 172 films observed by 141 critics. Their results show that the effect of a bad reviews decreases over time and that a ‘negativity bias’ exists where bad reviews hurt more than a good review helps. They also observe that stars and big budgets help films which have received a negative review, but there is not as much of an effect on films which receive a good review.

Ravid *et al.* (2006) further investigate the role of critics by focusing on the following questions: (1) to what extent critics’ views are biased on particular studios/distributors, (2) whether viewers are able to distinguish between non-biased and biased distributors and avoid biased distributors and (3) how distributor bias varies with the reputation/experience of the critic. Using the same data as the earlier studies of Ravid (1999), and Basuroy *et al.* (2003), their results show that certain studios affect the nature of reviews, big budget films earn more reviews which are more likely to be negative, and star studded films earn more positive reviews. They also examine individual critics’ responses (for those who reviewed at least 35 films) and averaged distributor coefficients across distributors to assess bias showing that a bias does exist with some reviewers to certain distributors. Further, they provide evidence that, against expectation, biased reviewers actually correlate with higher box office revenues in domestic and international markets suggesting that audiences respond to biased critics. Another finding of their study is that critics based in L.A. are more biased towards giving a positive review and conjecture that the network of producers, actors, distributors etc. residing in L.A. may provide an explanation for the corporate bias observed.

Gemser *et al.* (2007) also investigate the predictor versus influencer effect with a specific focus on art-house films versus mainstream films. Their study focuses on 84 films released between 1998 and 2003 in Dutch cinemas. They use the ‘nature of review’ and the ‘size of review’ and weight these by the circulation of 13 daily Dutch newspapers. They find evidence that reviews have an (influence) effect on art-house demand, but no such effect on mainstream demand yet they do have a prediction effect. They show, however, that this only holds true for the size and number of reviews and not their nature – suggesting that coverage of any sort is better than no coverage at all.

In an insightful study Reinstein and Snyder (2005) also consider the prediction versus influence effect of reviews by exploiting the timing of the review in relation to the opening weekend box office. They adopt a ‘difference-in-difference’ approach to purge the prediction effect from the model by noting that the prediction effect is present both before and after a review announcement, but the influence effect is only present once the announcement has been made. They combine box office revenue data

of 609 movies with Siskel and Ebert's reviews (and the date of the review) given that these were two of the most prominent reviewers over their sample period with a nationally syndicated TV show. Reviews are categorized as 'no thumbs up', 'one thumb up' or 'two thumbs up'. Their results show a small but significant influence effect which appears more prominent for narrow releases (less than half median screens) and for drama films – the implication being that reviews are more important for 'art' rather than 'event' films. They also show that a positive review early in the run increases the audience as an expansion effect rather than simply shifting demand from later in the run to earlier in the run at the expense of competing films. When they compare the difference-in-difference approach to the more traditional method of simply including reviews as an explanatory variable the results suggest a significant bias that although reduced by the inclusion of additional quality proxy variables, is still present and overstates the statistical significance of the review effect.

Zuckerman and Kim (2003) investigate another aspect of the relationship between reviewer and financial success of a film by considering what they term 'identity assignment' for a sample of 396 films released in 1997 in the US market. They characterize identity as being dependent upon the type of critic who reviewed it and characterized it as being 'fit for the mass market'. That is, when a critic who specialized in major release films reviewed it favourably, it had potential to 'break-out' and achieve box office success in the mass market; however, they also showed such a favourable rating handicaps a film from penetrating the art-house market.

Ginsburgh and Weyers (1999) consider another dimension relevant to the role of the reviewer by focusing on the 'quality' of movies as judged by experts (critics, actors, directors etc.), *vis-à-vis* quality as judged by consumers. Their investigation centres around whether quality evaluation are long lasting by examining (1) the effect of nominations/awards and whether or not they subsequently appear in best movie lists for the experts and (2) the effect of box office and subsequent frequency of appearance on TV for consumers. Their data set covers 249 films from 1950 to 1970 that were either included in the Oscars or Cannes, and/or featured in best movies lists. Their results show that quality assessments made in Cannes (and to a lesser extent Oscars) are short lasting as films do not frequently appear on the best movies of all time lists – from the 174 nominations/awards, only 47 belonged to the 122 movies selected as the best of all time. In contrast consumers appear more consistent as box office is strongly correlated with frequency of TV showings. The results also show that when films come out there is agreement between experts and consumers (awards and box office are correlated) but this effect diminishes over time implying that either the two groups value different attributes, or they value them differently through time. A further finding is that American films dominate in terms of commercial success and quality, but emphasize being American does not necessarily imply quality *per se*.

In a related study, Ginsburgh (2003) examines the role of awards, economic success, and aesthetic quality in a contribution that also examines the book and music industries. His data cover all films nominated and awarded for 'best picture' type awards in a number of prominent film award ceremonies between 1950 and 1980, and a further set which have appeared in three separate 100 best movie lists all published in the late 1990s. Combining this information with rental data (i.e. revenues retained by the distributor) on film success, his results suggest that awards and commercial success are positively correlated but refrains from implying direct causation from awards to commercial success. The results also show that the aesthetic judgement of critics on the best movie lists is a significant determinant of commercial success but is insensitive to the number of lists, yet once awards and nominations are added only movies which appear on all three lists earn superior revenues. A further observation of the study is that movie awards often do not go to the best quality movie given that, for example, only 26% of movies which have one an Oscar for best picture appear on all three best movie lists considered.

In another study concerned with quality assessments of motion pictures, Holbrook (1999) looks at the popular appeal versus expert judgement paradigm using data compiled from a sample of the 5000 films represented in the popularity polls of viewers conducted by Home Box Office in 1989. From this, a sample of 1000 movies were selected in a manner that included only films released before

1986, those that had won an Academy Award, those that had been listed as a box office hit and/or been voted in a top 100 poll by certain key commentators, and others that had been nominated and/or awarded in various other industry film lists and competitions. He examined two research questions: (1) do the determinants of 'popular appeal versus expert judgement' suggest differing or common standards of evaluation for consumers versus critics and (2) do discrepant (shared) tastes produce a negative (positive) correlation between popular appeal and expert judgement. His results suggest that ordinary consumers and professional critics do emphasize different criteria in the formation of their tastes and there exists negative correlation between popular appeal and expert judgement.

### 3.1.3 *The Role of Awards and Award Nominations*

Every year the film industry holds a number of famous and glamorous award ceremonies (e.g. the Academy Awards) which also provide mass entertainment unto themselves. There is strong evidence that award nominations and award wins significantly impact on box office revenues and consequently distributors are very responsive to them. For example, distributors may alter release dates to improve a film's chances of nomination and, if successful, will often use the nomination/award in their marketing campaigns. It is therefore little wonder that a number of researchers have sought to empirically examine the effects of nominations and awards on the box office. In what has often been cited as one of the first empirical studies of the determinants of successful movies to appear in a mainstream economic journal, Smith and Smith (1986) investigate a sample of film rentals in relation to Academy Awards of best picture, best actor/actress, best director and total number of awards. Their study considers a sample of 600 films which they analyse over three sub-samples defined as 1950s and prior, 1960s and 1970s. The self-admitted 'preliminary' analysis provides a number of 'mixed results' suggesting that the determinants of successful films have changed over time based on the statistically significant increase in the magnitude of the effect of total awards, the decline in the apparent role of best actor/actress, and the change of the effect of best film from the 1960s (where it was negative), to the 1970s (where it became positive).

A more recent detailed study by Nelson *et al.* (2001) employs a panel data set of weekly box office figures of 131 top 50 films released between 1978 and 1987 which were nominated for Academy Award best picture, best actor/actress, best supporting actor/actress, and a control sample of 131 non-nominated films which were released in the same week and were the highest ranked film for a minimum of 5 weeks. In the first part of their empirical analysis, they model the 'average revenue per screen' and 'share of total screens' as a function of film fixed effects, seasonal (quarterly) dummies, week of release (polynomial) and number of nominations/wins for each of the five categories. They subsequently model the relationship using a flexible structure to account for timing of release relative to nomination/win announcements. In the second part of the empirical analysis they employ a survival model (Weibull with heterogeneity) to analyse how the duration of time which a film spends in the top 50 is affected by nominations/awards. The combined results suggest that a nomination or award for best picture, or best actor/actress in a leading role has a positive effect on survival, average revenue per screen and share of screens, but a nomination/award for best actor/actress in a supporting role has little effect on these variables. They show that, for example, a best picture nomination/award can increase box office revenues by \$4.8m/\$12.7m respectively and liken the outcome to a two-stage, single-elimination tournament where films first compete for a nomination and the survivors compete for the award. The convexity of the nomination/award payoff is consistent with this sort of tournament.

Deuchert *et al.* (2005) also examine the effect of Academy Award nominations and awards on movies' financial success by considering a sample of 2244 movies (32,040) observations released in the US market between 1990 and 2000. They examine five definitions of awards: best picture, best actor/actress in leading role and best actor/actress in supporting role. They employ two models: (1)

examine the effect on weekly revenues assuming the effects do not diminish over time, controlling for number of weeks already released, opening week revenue, seasonal effects, genre and distributor effects and (2) allowing time dependence and also differentiating between films which are nominated but do not win and those which are nominated and do win. Consistent with the approach of Nelson *et al.* (2001), they also consider a survival analysis in their study; however, the results of their analysis differ as they find that while the awards have a positive effect, the main effect is through nominations. They show that there are three channels of success: (1) winning best actress in a leading role, (2) winning best picture, (3) winning a best actor in leading role benefit more than when the awards are announced. An apparent implication of their analysis is that investment in awards is less profitable once nominations are made than the industry would expect.

Lee (2009) takes an international/cultural perspective on the role of Academy Awards on motion picture demand. Using nominations and awards as indicators of cinematic achievement he investigates the relationship between such achievement and a sample of US films' box office revenues in nine East Asian countries. In the analysis he makes a distinction between 'drama' awards (e.g. best director, best leading and supporting actor/actress, best screenplay and best film editing) and 'non-drama' awards (all other awards) to investigate how films defined in these respects may have cross-cultural appeal. Using data on the top 100 US movies from 2002 to 2007, the results show that non-drama awards relate positively to box office revenues, but drama awards show negative correlations. The interpretation of such results is that films with culturally specific (American) storylines do not translate for East Asian audiences as well as films which, for example, might contain relatively more special effects. Further, he finds that the negative relationship of drama awards and East Asian box office appears more pronounced in countries less culturally similar to the USA in terms of a culture similarity index.

### 3.1.4 *The Role of Ratings and Genres*

Most studies that consider 'demand' for motion pictures in an empirical setting typically include control variables for genre and rating variables. Some studies, however, have considered more closely the role of these variables in a general setting of demand. De Vany and Walls (2002) investigate the distribution of revenues, rates-of-return (defined as revenue/budget), and profits (approximated as  $0.5 \times \text{revenue} - \text{budget}$ ) across the same sample of 2015 films considered in De Vany and Walls (1999). In their sample, more than 50% of all films were R-rated, whereas only 3% were G rated. The descriptive statistics suggest that stars were more likely to feature in an R-rated film, and particularly in high budget films. Using the stable Paretian model, they show that there is more probability mass in the (right) tail of the G, PG and PG13 films relative to R-rated films, and all other ratings stochastically dominate R-rated films' rates-of-return up to the 75th percentile – however, this result is primarily driven by a number of low budget R-rated films in the sample. Their analysis of profit reveals that this distribution is also asymmetric and that there is more probability mass in the right tail, than the left tail across all ratings. Further they demonstrate that R-rated films have less probability mass in right tail (i.e. less breakout films) and (with the exception of PG13) more probability mass in the left tail (i.e. more chance of losing money). In their concluding comments they suggest that Hollywood may be responding to other incentives (e.g. artistic/peer acceptance), rather than succumbing to audience demands, or alternatively that the decision makers involved simply do not understand the odds involved.

Ravid and Basuroy (2004) consider the impact of genres and ratings on film performance. Using the same data set as Ravid (1999), augmented with opening week (domestic) revenues, advertising information, positive review proportions, and the number of total reviews, they distinguish R-rated films as violent, very violent, sexual content and both sexual content and violent. Their mean comparison results show that violence translates to higher revenues but sex does not. The results show that, although films with violent or sexual content do not necessarily increase profitability, they lose money less often.

They also provide evidence of sales maximization, rather than profit maximization, which may occur because of (1) the oligopoly environment (because, among other reasons, studios care about market shares and revenue figures are highly visible, whereas profit figures are not) and (2) agency concerns (because executives may not have budgetary control over the input process).

### 3.2 *Production*

There are many interesting economic issues that arise from the production of motion pictures. Without being exhaustive, many of these relate directly to the contractual, financing and integrative arrangements of the production process. Chisholm (1997) describes in much detail the contractual and institutional arrangements with respect to the producer, screen-writer, director and actor relationships with the studio. Primarily, however, her analysis focuses on the producer and actor relations with respect to fixed or share contracts over revenue and/or profit.<sup>11</sup> In the context of the standard principal-agent model, she argues that share contracts are beneficial, particularly for the actor given that the producer can be monitored more easily so shirking is easier to detect. She points out, however, that there are legal costs associated with implementation of a share contract beyond a fixed fee contract. For example, additional clauses may be required defining exactly what constitutes revenue (e.g. domestic, international, ancillary etc.), and if it is profit then there needs to be more clauses discussing definitions of cost (negative cost, interest, distribution expenses). There is also room to exploit incompleteness in definitions leading to enforcement costs. Her data set is derived from clippings of journals and periodicals with a total of 118 payment schemes recorded between 1959 and 1989. Of these, 49 were share payments, and 69 fixed payments. Her results reveal that contract length, actor's experience and revenue generating ability all increase probability of a share contract. Prior collaboration and Oscar recognition (under less statistical significance) are also shown to increase the likelihood of an actor receiving a share contract.

In subsequent related research, Chisholm (2004) considers the size of the fixed payment portion of star contracts using the same data set as her previous study covering the years 1959–1989. She explores various explanations for the size of the fixed payment relating to (1) rent capture, (2) risk sharing, (3) signalling and (4) portfolio optimization by studios. Her results show that the size of fixed payment moves with actors history, and that when contracts include fixed and share components, the fixed part is influenced by risk concerns. She also shows that fixed payment contracts only are influenced by measures of signalling (marketing) and star power, and that both types of contracts support the rent capture theory that actors are paid rents upfront for the value of the star power they bring. Another explanation of the fixed part of the contract is that it serves as a risk premium which might move with the level of film riskiness (e.g. if film genre changes from that of actor's last film then this may increase risk).

Corts (2001) considers the integration arrangements of production and distribution and examines two questions. First, do vertical structures that involve multiple upstream and downstream firms achieve efficient results, and secondly do divisionalized firms act like fully integrated firms or competing individual firms. His data set examines the release dates of films in 1995–1996 where 80 production companies distributed their films through 13 distributors (many of which also have their own production companies), and partitions weeks of year into windows by two methods: (1) linking troughs in Murphy's historic database (reported in Vogel, 2007) creating 10 seasons per year and (2) centring windows on the peak of cycles creating eight seasons per year. The empirical model investigates how the distributor/producer relations impact on a pair of films' release gap in an OLS and (two sided) Tobit model – because the maximum gap is the number of weeks in the window. The primary right hand side variables are the corporate ownership arrangements of distributor/producer. His results suggest 'Same Producer, Same Distributor' films are released further apart and even having a common distribution alone may help to achieve an efficient outcome, but not as successfully as also sharing the same

producer. Also, films sharing just the same producer do not achieve efficient outcomes if they do not share the same distributor. He also extends the model to investigate at the role of divisionalization (i.e. different production houses) within the studio and the results show that the divisions act just like the firm. His evidence suggests that the more complex vertical structures generally do not achieve efficient outcomes for the structure, and that divisionalized firms generally behave like integrated firms, not like competitors. He also finds that the release dates for films sharing the same genre are generally further apart, and that big-budget star laden films are more likely to compete head to head.

Fee (2002) investigates financing decisions of filmmakers in relation to studio versus independent financing. Using a sample of 349 US films released in 1992–1993 he investigates whether films are more likely to be independently financed in relation to the filmmaker's 'artistic stake' and 'effort'. More broadly, his analysis relates to the theory of incomplete contracts in the sense that there is potential a trade-off between monetary incentives and managerial benefits in studio versus independent financing. By using proxies for marketing effort (number of opening screens) and artistic effort (critical review as reported in *Variety*), he initially investigates what determines these in relation to genre, budget and sequels and settles for the genres of 'action' and 'comedy' as defining films with relatively lower artistic quality when 'budget' is omitted, and just 'comedy' when 'budget' is included. The results of his logit and probit models suggest that a film is more likely to be independently financed when the artistic stake is high and when the film's genre requires a higher personal exertion of effort.

Goettler and Leslie (2005) investigate the co-financing arrangements of major studios with other studios, or independent production companies, where co-financing implies an equity stake. Their data set considers a sample of 1305 titles released between 1987 and 2000 by a major studio. Of these, 361 were co-financed with an independent and 32 were with a major studio. They consider a couple of potential explanations for co-financing: (1) that it is used to finance relatively riskier films and (2) that it is used to manage portfolio risk – for example, covariance between titles (genres) and law of large numbers (would prefer a small stake in many films rather than a large stake in a single film). Ultimately, however, they provide evidence against both of these and provide two alternative explanations: (1) co-financing is used to make more big budget films (that may also be tied into theme parks and other merchandising etc.) and (2) to help in achieving more spaced release dates and less competition in this aspect.

Palia *et al.* (2008) also explore co-financing with a data set of 275 films produced by the 12 major distributors. They identify 148 co-financed films and 127 solo-financed films using various trade publications and interviews with executives, and investigate the following potential explanations: (1) risk reduction hypothesis, (2) internal capital market hypothesis (when firms have limited capital with multiple projects will allocate limited capital to the most successful projects), (3) managerial bargaining hypothesis (e.g. director may earn more when project is carried out through alliances), (4) market structure hypothesis (i.e. that alliances lead to less competition and an increase in concentrations), (5) resources pooling hypothesis (which implies larger budgets will be associated with co-financing), (6) specialization hypothesis (will specialize according to comparative advantage and hence lead to more profitable outcomes) and (7) lemons hypothesis (that the poorer quality movies will be co-financed). Their results show that project risk is important to co-financing and that studios finance their less risky projects internally. They also find that studios which co-finance are more likely to have higher risk differentials and be financially constrained. Although they are able to find partial support for resource pooling hypothesis, they are unable to show significant differences between performance of the two types of films (i.e. co-financed versus non-co-financed) which leads to rejection of the specialization and lemons hypotheses. They also suggest that firms may form these alliances to participate in projects in which they would otherwise not be involved with.

Jansen (2005) explores a different dimension of film financing by considering the role of funding bodies (or more accurately subsidization) in the German film industry. He examines (1) the determinants of German cinema admissions and rates-of-return, (2) the impact of subsidies as allocated either (i) by

a committee or (ii) by reference to past successes and (3) the profitability of the German industry. He notes that subsidies account for over half the average budget in German films, and that every film is subsidized to some extent. He argues because of Germany's long tradition of cinema as 'art' rather than entertainment, some producers may pursue other objectives than profit, and that committee subsidization may relax the incentive to increase earnings over expenditures because (the state) pays the difference. The reference principle, on the other hand, links funding directly to the previous performance of the production company, and therefore creates stronger incentives for profit maximization and audience appealing films. The data set he uses covers 120 (of 367) German films released between 1993 and 1998. In his empirical model the dependent variables are admissions and producer's rates-of-return, whereas the independent variables include subsidies (committee and reference), star power, director power, budget, reviews, genre, rating and distributor size. His results suggest that there is a group of production companies which regularly outperform others (supporting reference subsidies over committee subsidies), and also that critical reviews impact positively on box office success.

### 3.3 *Distribution*

The distribution of motion pictures involves the problem of choosing a release date, deciding on an opening number of prints (and adjusting these in subsequent weeks), and designing and implementing an advertising campaign. One of the most important decisions of the film distributor relates to the timing of a film's release. Krider and Weinberg (1998) investigate the release date timing game between two films in a finite season using a two parameter 'share-attraction' model – where films have an initial (fixed) attraction parameter, and a decay parameter. Their theoretical model shows that three equilibria may emerge: (1) a single equilibrium where both films simultaneously enter (if both have long legs the loss from delay outweighs the loss from competition), (2) a single equilibrium with one film opening at the beginning and the other film delaying (if asymmetry exists) and (3) a dual opening with either movie delaying opening (if films are identical but have short legs and can benefit from not going head to head). They empirically test their model on 24 major films released during summer of 1990 by proposing a regression model where the dependent variable is the number of weeks from beginning of the season at which a film is released, against independent variables including the opening weekend box office and (half-life) run length. The results showed a significant negative effect of opening weekend box office, i.e. more successful films are released closer to the beginning of the season, but no significance of run length – suggesting that legs are ignored, or are hard to anticipate based on word-of-mouth uncertainty.

In two insightful contributions Einav (2007, 2009) also investigates the relationship between seasonality and the release timing decisions of distributors. Einav (2007) investigates a sample of wide-release movies released in the US market between 1985 and 1999 (covering 1956 titles) to explore the notion of underlying versus observed seasonality. Underlying seasonality may differ from observed seasonality when distributors release their popular titles on big weekends amplifying the underlying pattern of demand. He proposes a discrete choice (nested logit) model of demand estimated with and without movie fixed effects whose coefficients are used to represent 'quality'. He then infers amplification effect by examining the magnitude of the standard deviations of the estimated weekly dummy variable between the two models. His results suggest an amplification effect in the order of 50%, or put another way, underlying seasonality is approximately two thirds of observed seasonality. He argues that because of fixed ticket prices, market expansion is due to number and quality of movies released, wherein the bigger markets attract bigger movies, and inflexible ticket prices means that prices do not adjust to offset increased demand.

In a companion paper Einav (2009) develops a discrete timing game of movie release with heterogeneous players. He proposes a 'pseudo backward induction' method to solve for the perfect Bayesian equilibrium sequentially which avoids the potential multiplicity of equilibria which is common

in these games. His data set is based on release date change announcements, which are published by Exhibitor Relations, Inc. as the 'Features Release Schedule'.<sup>12</sup> Release date changes are common in the motion picture industry which arise both because of internal reasons and in response to competitors' release announcements. He defines four release windows (5-week periods) and considers the set of players as exogenously given (i.e. all players are fully observed). Periods observed coincide with major holiday weekends of Presidents Day, Memorial Day, Fourth of July and Thanksgiving. Using demand estimates from Einav (2007), the main empirical finding is that movie distributors over cluster their release dates, with too many good movies on big weekends, and that the industry could earn more profits by spreading out release dates.

Moul (2008) focuses on other aspects of the distributor's problem with respect to weekly (national) screen allocations and advertising decisions. He uses a PDGEV (principles of differentiation generalized extreme value), similar to a nested logit, to estimate demand and then apply this to a model in which distributors choose weekly screen (theatre) allocations and weekly advertising (for which a proxy of newspaper advertisement size is used). Using the same data set as Moul (2007) – discussed above – but with the addition of advertising, his results suggest that distributors have found some ways to collude and limit payments to exhibitors and that advertising is excessive in the industry. Also, the results suggest that there may be too few cinemas meaning that consumers travel too far to reach cinemas.

### 3.4 *Exhibition*

The exhibition industry also offers much scope for economic investigation and, in particular, applying the techniques of empirical industrial organization to understand its structure, conduct and performance. In a series of papers, Davis (2005, 2006a, b) considers a number of issues pertaining to the practices, structure and spatial characteristics of the US motion picture exhibition industry over the years 1993–1997. Using data covering 101 markets in North America, Davis (2005) finds statistically significant relationships between local market structure (number of screens owned by own and rival companies within a local market) and the change in admission prices. In his substantive data set, which covers 56,729 pricing points from a total of 5743 theatres, he observes that the effect of local competition is small, and finds no evidence that controlling local ownership (i.e. increasing competition) will necessarily lead to lower prices. There is even some evidence that common ownership may actually help to bring down prices which may be plausible given that exhibitors are likely to prefer lower prices (than distributors), and exploit profit margins in pop-corn sales where they do not share revenues.

In subsequent research, Davis (2006a) again uses a 5-year sample of theatre revenues over the years 1993–1997 to examine (1) incumbent rivals' revenues (business stealing), (2) own-firm revenues at existing theatres (cannibalization) and (3) total industry revenues (market expansion) by focusing on a period where there were a number of entry (mostly high quality multiplexes) and exit decisions (mostly smaller low quality theatres) in the US exhibition industry. His results provide evidence of substantial business stealing effects (consistent with industry reports), and also considerable market expansion effects (\$30–\$50k per screen). He also shows that business stealing is localized to about 15 miles around a theatre location, but finds little evidence of cannibalization arguing that the process of entry occurs primarily through theatre chains building new high quality theatres near their rivals, rather than close to their own theatres, and not by upgrading to protect a location (defensive building).

In a particularly detailed study Davis (2006b) develops a random coefficients discrete choice model to examine cinema demand using daily admissions of 607 theatres across 36 markets over a seven day period in June 1996. Along with a number of theatre characteristic variables (such as ticket price, consumer service, whether or not the theatre had Dolby or DTS technology etc.) and film fixed effect variables, his demand model also incorporates demographic information from the census to construct population counts around local cinemas with respect to (concentric circle) distance measures. He finds

that (quadratic) travel costs result in limited substitutability between theatres and local markets. He argues that the main constraints on the exercise of market power through admission prices involve (1) consumers substituting to other activities and (2) incentives of distributors (i.e. theatres would prefer lower admission prices if they could attract the same set of films).

Orbach and Einav (2007) also consider cinema ticket prices in a study of the US market and evaluate potential economic reasons for the (almost) uniform pricing practices observed in the industry. They examine two dimensions of the puzzle: (1) the movie puzzle (why different movies are priced the same) and (2) the show-puzzle (why different times, days and seasons are priced the same). They provide detail that during the pre-Paramount era (i.e. before 1948) variables pricing strategies were used with respect to films categorized by quality as A, B, C or D. This continued into the 1950s and 1960s where event movies were priced above other movies and also there was price variation with respect to weekday versus weekends, and by type of seat. They examine potential explanations for uniform pricing based on (1) behavioural explanations, i.e. (i) perceived fairness, (ii) unstable demand when price might be viewed as a signal of quality and (iii) demand uncertainty, (2) menu and monitoring costs and (3) structural characteristics of the industry and regulatory constraints, i.e. (i) agency problem (i.e. the misalignment of distributor and exhibitor incentives such as lower ticket prices due to concession revenues, and underreporting of revenues) and (ii) double marginalization (which could be internalized with vertical integration). Their conclusions are that exhibitors could increase profits if they practised variable pricing, and that the industry could gain, for example, by pricing event movies higher and by charging different prices for different times.

Chisholm and Norman (2006) consider another important strategic issue relevant to the exhibition sector of the industry by investigating the dynamic issue of when to replace a film at a specific location. They use theatre level data of three first-run theatres in the Boston area for a sample covering between 106 and 121 films at each location released over the period June 2000 to June 2001. Their empirical survival model considers film-at-theatre survivorship in relation to intra-theatre (rank at theatre) considerations, factors external to the theatre (national screens, revenues, stars), and inter-theatre considerations (ownership). The results of their analysis show that theatres within chains avoid business stealing (cannibalization) by decreasing survival times, and that cinemas owned by different companies engage in business stealing by increasing the length of a run. Other (control) variables of their analysis (screens, revenue and stars) show significance but low impact on theatre survival.

Of long-standing interest to economists interested in this industry has been the structure and design of the exhibition contract, however, very few researchers have actually had access to them for empirical analysis. The research of Filson *et al.* (2005) provides an exception.<sup>13</sup> These authors develop a theoretical model to analyse the movie exhibition contract and show that difficulties in forecasting revenues provide better explanations of the declining share of revenues, rather than explanations based on asymmetric information. The model also shows that risk aversion by each party and measurement cost minimization helps explain the typically observed declining share structure. The study employs a data set of 2769 contracts of 13 cinemas of one of St Louis' prominent exhibition companies. Under legal confidence, they describe the nature of the contracts (without being specific) and investigate a linear sharing rule (as opposed to a sliding scale), and argue that the likely reason this is not adopted is because it may encourage exhibitors to reduce the length of a run.

Gill (2007) also provides evidence on the exhibition contract by utilizing data on exhibition contract 'renegotiation' (which may occur when a film performed better or worse than expected) to investigate reasons for vertical integrative relationships between distribution and exhibition. His data set is particular to the Spanish film industry from 2001 to 2002 and covers 369 films from 21 distributors across 277 theatres. His data set includes the distributor, film nationality, Spanish box office, US box office and release date of each title. In his study, distributors qualify as integrated if they owned at least one theatre, resulting in five distributors being classified as integrated. He takes advantage of the fact that non-integrated theatres play integrated and non-integrated distributors'

films. The results provide evidence that integrated distributors are more likely to distribute movies with higher renegotiation frequencies, and that they are more likely to use their own theatres for such movies. Further, he suggests that transaction costs are the likely reason for observing such behaviour.

Collins *et al.* (2009) examine product differentiation of programming decisions in a study of Italian cinemas. Their sample consists of a sample of 282 cinemas with 870 screens observed across three Italian regions (Piemonte, Lazio and Campania) during 2006. They observe that the cinema industry has been in a state of transition with growth of multiplex cinemas around the major centres and address the question as to whether or not this has led to more conformity in programming decisions. Creating an index of 'conventionality' which captures the average number of cinemas showing the same titles as the reference cinema, they investigate the determinants of conventionality as related to population, age structure of the population, income (GDP) and whether or not the cinema was a multiplex. The results reveal that higher population leads to higher conventionality in programming (i.e. more cinemas showing the same film), more young viewers (percentage below and including 14 years) lead to a higher turnover of films – less conventionality, higher income increases conventionality and multiplex cinemas also increase conventionality – although not in the model where cinemas (rather than single screens) are considered which is a manifestation of the construction of the conventionality index in this respect.

#### 4. Movie Macroeconomics

A number of studies have taken a macroeconomic perspective in considering the film industry. Rather than focusing on an individual aspect of the industry, such as the demand for a particular film of given characteristics, the research detailed in this section focuses on the big picture issues pertinent to the industry. For example, movie macroeconomics might consider aggregate patterns of cinema demand (and supply) and the impact of various policy, economic and social changes which have occurred such as the introduction of TV and VCRs, or a change in copyright laws. This section is sub-divided into discussions of aggregate cinema demand, understanding audiences, trade of motion pictures and industry structure and finally copyright and piracy. As with the previous section on movie microeconomics, these classifications serve only as a guide to the subject matter as a number of the studies reviewed could arguably be grouped into more than one of these categories.

##### 4.1 *Aggregate Demand for Cinema*

As with the literature on demand for individual films, there is now also a significant collection of studies which deal broadly with what might be termed aggregate cinema demand, i.e. total market demand at an aggregated level such as weekly, monthly, quarterly or annually. Often such studies seek to make use of time series techniques and associated time series variables such as ticket price indexes and income data. Of particular interest as well have been the structural changes in demand brought about by such things as the introduction of TV and VCRs. In a series of papers, Cameron (1986, 1988, 1990, 1999) examines the demand and supply of cinema at the aggregate level in the UK. Using monthly data on cinema admissions, prices, incomes and television licences, Cameron (1986) notes that the UK cinema industry had been in a state of decline since 1957 which may in part have been due to higher ticket prices and substitution towards other goods (e.g. TV). He also found strong positive income elasticity of cinema demand and that relative price elasticities are significantly greater than one in an absolute sense. This, he argues, is consistent with either profit maximization with shifting marginal costs or *ad hoc* price adjustments. Cameron (1988) further suggests that the introduction of VCRs had a negative impact on cinema admissions. However, due to data availability only at the annual level for VCR sales, he refrains from attempting to quantify the size of the impact.

Cameron (1990) revisits the issue of income elasticity using pooled cross section data. Comparing his estimates of income elasticity with a range of other research on leisure and cultural activities (sport, orchestra, Broadway theatre etc.) he notes his results are at the top of this range, being close to other performing arts, suggesting cinema falling into the same category as more obviously art related or cultural goods. Using the same data set, Cameron (1999) investigates Becker's rational addiction model, which has previously been applied to consumption goods such as cigarettes, alcohol and gambling. His results, however, fail to provide any strong support for the rational addiction model describing cinema demand.

Hand (2002) uses an ARIMA (autoregressive integrated moving average) model to investigate a data set of annual British cinema admissions from 1936 to 1999. The ARIMA specifications employed are (1, 1, 1), (2, 1, 0) and (0, 1, 2) – where (a, b, c) denotes the order of (a) autoregression, (b) integration, (c) moving average. He truncates the last 3 years of his sample to provide forecasting checks of his models with the actual data and finds that the (1, 1, 1) model is capable of providing only short range (i.e. 1 year) forecasts. He suggests the results are symptomatic of a combined market expansion effect and product substitution effect when a good film is released which captures positive word-of-mouth.

In another study using British time series data, MacMillan and Smith (2001) investigate cinema demand and supply in response to competition from TV using annual data from 1950 to 1987. These authors use VAR (vector autoregressive) time series techniques to investigate the effects of ticket prices, TV ownership, the number of cinema sites, income per capita and (age) demographics on cinema demand during this period. Their results show that negative shocks to demand throughout over the sample period reduced the supply of screens, consequently having a feedback effects on admissions. They also observe, however, that introduction of multiplex cinemas in the 1990s interrupted and partially reversed this downward spiral.

Dewenter and Westermann (2005) consider the demand for cinema in Germany using annual data over the period 1950–2002. They note that attendances of cinema peaked in the 1950s but fell drastically thereafter with the introduction of TV among other things. Using a single equation framework, they find that cinema demand is elastic to price (−2.25) and income (4.48) – suggesting that it is a luxury good – and note that the market share of commercial television channels is negatively related to demand for cinema. They also model simultaneously demand and supply using two-stage least squares (2SLS) and seemingly unrelated regression techniques and find that (absolute) own price elasticity of demand is in the range 2.40–2.76, prices of other (substitute) cultural goods have positive and significant coefficients, but income elasticity is lower than the single equation model and sometimes insignificant. With respect to the supply side of the model, they observe that lagged attendances and population growth increased supply, but that the introduction of TV and VCRs had a negative impact on supply.

Fernandez-Blanco and Banos-Pino (1997) examine cinema demand in Spain using a cointegration analysis on annual data set spanning 1968–1992. They examine the effects of changing theatre ticket prices (combined with travel prices), income and TV as the primary explanatory variables of annual admissions. To model the impact of TVs they create a dummy variable which takes the value one after 1984 – the year state television ceased to be monopolized in Spain. They find that cinema is a luxury good and that its demand is elastic with respect to price. They also find that that the increase in television programming in the 1980s was responsible for a maximum of 9% reduction in cinema attendance.

A recent study of Bi and Giles (2009) using weekly US weekend box office totals has employed extreme value theory to model industry returns over the period 1982–2006. They use the peak over threshold method to fit industry returns to the upper and lower tail of the generalized Pareto distribution, and then investigate two typical measures of risk using the value at risk and expected shortfall techniques on the implied distribution. The results suggest the returns are appropriately modelled using the generalized Pareto distribution and that for a given investment in the industry, the probability of loss is relatively lower than the probability of gain.

#### 4.2 *Understanding Audiences*

Cuadrado and Frassetto (1999) examine the growth of multiplexes and the effects on cinema demand in the Spanish industry. Using survey analysis of 505 cinemagoers aged between 14 and 35, they examine the segmentation of the cinema audiences based on demographic and socio-economic variables to gain insights into the profile of young cinema audiences. They find three differentiated groups of cinema attendees – the social, the apathetic and the cinema buff – and that different types of cinemas have different appeal to different groups – shopping centre multiplexes having wide appeal and multiplexes specializing in non-Spanish films having appeal to cinema buffs.

Collins and Hand (2005) also consider a survey approach in their analysis of aggregate patterns of cinema attendance. They examine the cross-sectional probability that individuals will go to a movie (in the last two months) using individual level data reported in the Cinema and Video Industry Audience Research survey.<sup>14</sup> They consider the socio-economic group of the respondent (as proxy for income measured on a six-point scale), age of respondent, residential identification variables (six-point scale), and the potential substitutes of television and video/DVD of explanatory variables. Although they do not observe price they contend that variation in ticket prices may affect time/day, or theatre, but not choice of whether to go or not to see a movie due to its constancy within the time frame considered. Their results show that (1) the probability of cinema attendance increases with income (socio-economic group), (2) one of the residential classification dummies is significant (affluent urbanites), (3) gender (male) is significant, (4) interaction of gender with age shows no significance (i.e. older men are less likely to go to the movies than younger men, or women their own age) and (5) video rentals and TV viewing have negative relations, but stress this as tentative due to potential endogeneity. To further check the robustness of their results, they also consider whether the model can explain who *never* goes to the movies. All of previously significant variables were still significant, suggesting the sample of films over the two month sample time did not appear to be biasing results in any systematic fashion.

Yamamura (2008) explores the recent revival of the Japanese cinema industry using aggregated attendance data from 47 prefectures over the period 1990–2001. He investigates annual attendance in relation to covariates relating to ticket prices, the proportion of Japanese titles shown, the characteristics of cinemas (screens, multiplex features, parking etc.), the availability of substitute products (satellite TV, cable TV), as well as information on the population demographics of the prefecture (density, age, immigration status etc.) and the nature of social networks (proxied by population turnover and immigration between prefectures). The results of his 2SLS panel analysis reveal that demand is price elastic, multiplexes increase cinema demand, parking availability increases attendance, domestic films decrease attendance, income impacts negatively (against intuition) on attendance, satellite and cable TV are substitutes for cinema, cinema attendance rates are higher for younger (20–24) and older people (60+) than other adults, and that the decay of social networks decreases attendance. In a further conditional logit analysis of the location choices of newly built multiplex cinemas using a similar set of covariates to the analysis of attendance, the results suggest that high levels of attendance discourage new infrastructure, higher ticket prices increases new multiplex construction, and that new multiplexes are less likely to be built where there are existing multiplex cinemas. As well he provides evidence that multiplex construction is less likely to take place in prefectures with a higher number of satellite and cable TV providers, and that the decay of social networks reduces the likelihood of new multiplex construction.

#### 4.3 *Trade of Motion Pictures and Industry Structure*

Marvasti (1994) examines international trade behaviour of motion pictures as ‘cultural goods’ and the effect of trade barriers on net exports of films. Using cross-sectional 1985 data across a number

of countries he models (film) trade as a function of a range of variables including population, capital–labour ratio, language, religion, GNP, quantitative restrictions, subsidies and (the lack of) intellectual property rights. He finds evidence that trade barriers do lead to higher net exports and the direction of trade in films is from rich to poor countries. He also estimates a Cobb–Douglas production function for film which shows that there are (close to) constant returns to scale in the industry. In following research, Marvasti (2000) again examines motion picture trade in relation to tariffs, market shares, domestic market size, taste similarities, VCRs, stars and domestically popular films among other variables. Using data from 1961 to 1988, his results indicate that (1) stars and domestic blockbusters do not influence consumption of films overseas, (2) tariffs are effective trade barriers and (3) VCRs increase the chance of piracy.

Canterbery and Marvasti (2001) show increased industry revenues are achieved when increasing star costs are incurred and that the studios rely on stars to differentiate their product. Using US data spanning the years 1965–1991 they test a number of hypotheses using time series techniques. In their analysis they examine the following: (1) hyper-differentiation of movies results in low price elasticity of demand for admissions, (2) the main successful source of product differentiation is the movie star, who provides information regarding the quality of the product to the consumer, (3) the presence of supra-specific human capital (stars) adds greatly to the quality, demand and revenue without a strong positive effect on *quantitative* film output, (4) the use of generic human capital or ‘cast members’ adds greatly to the quantitative film output while affecting demand or revenue little, (5) circulating capital affects positively quantitative *and* qualitative film output, (6) the movie experience is an inferior good and (7) economies of scale exist in the production of movies. In their analysis, they define a ‘blockbuster’ as a movie grossing at least \$10 million in real terms (1982–1984 dollars) and define a ‘star’ as an index based on the results of a randomly distributed survey. Their results suggest that they can support most of their hypotheses and note that external as well as internal economies of scale, imperfect competition and vertical integration have been critical to the success of the US movie industry.

In a further study of motion picture trade, *vis-à-vis* cultural and other barriers, Marvasti and Canterbury (2005) use a gravity iceberg model to explore the apparent paradox of the US motion picture industry’s proliferation despite various obstacles relating to protectionism, rising costs and relatively stable ticket prices. Using annual pooled cross-section data of 33 countries over the period 1991–1995, the authors observe that trade barriers are: mostly non-traditional in nature with some of the biggest ones relating to denial of property rights – i.e. movie piracy. As a first stage, they employ a Poisson model to explain a numerical index of the *number* of trade barriers and an ordered probit model to explain a qualitative index of the *complexity* of trade barriers. Included in their explanatory variables are the ratio of motion picture investment to GDP, number of films produced, whether or not country is adjacent to the USA, adult literacy rate, percentage of English speaking population, and percentage of Judeo-Christian population. In the second stage, they use the predicted values of trade barriers in an instrumental variable framework to estimate the US export Function for motion pictures. In addition to the instrumental variables, they include the gravity measure (spatial distance and income difference) and other cultural barrier variables related to adjacent country or not English speaking percentage, literacy rat, Christian religion rate, and whether or not the country classifies as less developed. They show that protectionism abroad tends to increase with US exports implying that particular countries desire to develop their local industries. They also argue that the Canadian and Mexican industries have used protectionist strategies due to their proximity to the USA.

Scott (2004) examines the structure of the US distribution market over the period 1980–2000, focusing on the role of independents, majors and subsidiaries of majors. His descriptive statistics suggest that although independents supplied over half the market during his sample period they controlled only about 10% of the revenue. He argues that the industry is segmented into three overlapping tiers and

proposes a simple regression model that focuses attention on number of titles released by the different types of distributors in a particular year as a function of money spent on films in the previous year and the prevailing interest rate. His results suggest that independent distributors are particularly sensitive to the former variable, for which he explains as riding on success of majors, and the majors are highly and inversely sensitive to interest rates, potentially owing to the larger production costs incurred and subsequent reduction in titles produced. He also notes that international export markets have expanded greatly in recent years, partly as a result of strategic trade initiatives underwritten by the US government.

#### 4.4 *Copyright Law and Piracy*

Using data from 38 countries during the years 1990–2000, Hui and Png (2002) investigate the impact of economic incentives on the international supply of big screen movies and, in particular, the impact of a 1998 change to copyright law in the USA. Using data on variables including TV and video ownership, personal disposable income and population, they develop a model of national movie supply and demand and examine two main questions: (1) how changing economic incentives (defined in the context of VCR ownership and higher levels of disposable income) affect equilibrium conditions and (2) how the impact of a change in US copyright law (relating to re-authorship copyright period) affects the industry. The results suggest strongly that the supply of creative work did respond to economic incentives; however, they are unable to provide any evidence of tighter copyright laws increasing movie production. They also note that the effect of TV ownership was significantly negative on the equilibrium supply of movies, suggesting that the substitution between television and theatre attendance outweighed the increased supply of movies through television and population growth.

Perhaps one of the biggest concerns to the industry in the present day is the potential for lost revenue from piracy. Although piracy may take a variety of forms, the main concern for studios and distributors is arguably the illegal sale of mass produced pirated copies, and the proliferation of downloading such files on the internet. Using confidential studio data from an actual leaked title, De Vany and Walls (2007) examine the impact on a film's potential lost revenue in relation to the number of illegal download sites which had it available for download prior to and during its theatrical run. Their simple regression framework examines the weekly change in distributor reported revenue as a function of time (i.e. week of run) and the number of download sites featuring the title. Although they observe a particularly small sample, they estimate the loss from piracy to be between US\$242 and US\$621 per active illegal download site and using a median quantile regression, with a time quadratic variable, as their preferred model estimate this at US\$437 per site. Overall their estimates suggest that the loss associated with a contemporaneous pirate internet release is on the order of US\$40m for a typical studio movie.

In another study concerned with piracy in the film industry, Walls (2008a, b) considers a cross-country analysis of 26 countries' piracy rates as reported in 2004 in relation to a number of socio-economic variables. Specifically, he considers an index of collectivism, cost to enforce property rights as a percentage of GNI, per capita GDP, and the number of internet users per 1000 people. The results of both a linear and logistic specification reveal that piracy is increasing in collectivism and decreasing in income, but once property right enforcement and the level of internet usage are included as explanatory variables, income ceases to be a determinant of the piracy rate. He also investigates how individual countries may impact on findings by examining the differences between estimated coefficients with and without the specific country included. This analysis revealed that Ecuador, Korea, Pakistan and Switzerland all have significant impacts on the estimated coefficients – yet the question of 'why' is left to future research endeavours.

## 5. Concluding Comments and Directions for New Research

The motion picture industry certainly offers economists many interesting puzzles – particularly for applied researchers. Although the industry may be small in comparison to other consumer industries, it is by far the largest ‘cultural’ or ‘entertainment’ industry. This paper has attempted to unify much of the existing research which has been written primarily by (applied) economists over the last two decades. Also, an attempt has been made to structure this discussion in a coherent way such that the body of literature which is increasingly becoming known as ‘movie-economics’ can be further sub-divided as either micro or macro, and then further grouped again with other similar research.

The history of the industry is particularly interesting, and the practices of pre-Paramount era have begun re-emerging across various countries. It seems true that vertical integration between production/distribution and exhibition (or part thereof) is a useful way in which to deal with the nature of the industry and, in particular, the extreme uncertainty faced. There is still much scope for new research in this area, with respect to integration formation, anti-trust issues, and the way in which films are licensed to exhibitors. In particular, what are the advantages of horizontal/vertical integrative relationships for firms, consumers and overall welfare? Do such alliances foster greater product diversity? Which parties are harmed by such practices? Etc.

It has become well understood that motion pictures are an inherently uncertain product. Given the industry’s obsession with reporting national sales figures, and the range of film specific variables which are either directly or subjectively quantifiable, it will remain an endeavour of economists to attempt to explain causal factors of films’ performance with respect to variables such as production budgets, advertising, screens, stars, reviews, awards, genres, ratings etc. There is also a growing realization, however, that there exist complications in models of this sort with respect to non-normal revenue distributions, and potentially endogenous right hand side variables. Future studies should seek remedial measures for these problems so that meaningful inference can be made in such models. In particular, the way in which studio/distributor expectations (and responsive strategic decisions) interact with consumer expectations and word-of-mouth will continue to provide an interesting area for research activity.

The various stages of production, distribution and exhibition also offer many opportunities for new research. Research related to elements of the production process will inherently involve an examination of contractual relationships (whether this be between artist and studio, or producer and studio etc.), and the manner in which financing arrangements are made. Research related to the distribution stage of the project has a large cross over with the work of marketing scholars, given the primary functions of the distributor relate to the strategic decisions of choosing an optimal release date and pattern, and also designing and implementing an advertising campaign. Empirical game theory techniques are likely to provide important insights to this dimension of the process. Finally, the exhibition stage and industry offers researchers and opportunity to examine short-run, medium-run and long-run problems as they relate to the day-to-day operations of film programming, the local competitive environment and entry/exit decisions of theatre owners. Empirical industrial organization researchers, using discrete-choice/differentiated-product models can usefully apply their tools here and with increased cinema level data availability this is likely to provide an especially fruitful area of research.

Finally, with respect to movie macroeconomics, studying aggregate patterns of cinema attendance will continue to provide useful insights as general structural changes occur both within and outside of the industry. In particular, given that the industry is moving to a new age of digital distribution and projection, these changes are likely to have an impact on viewers’ habits. Also, given the falling prices of substitute technologies (including Plasma and LCD TVs and Blu-Ray), it is also likely that these will impact on aggregate patterns of attendance should the industry not respond accordingly. Another important and to-date under researched issue confronting the industry is that of piracy. Given the proliferation of the internet and the increasing speed of bandwidth, the piracy problem is likely to become particularly important to the film industry over the next few years.

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## Notes

1. There is something of a grey area between much of the marketing and economic literature on motion pictures. This study discusses in detail only a small number of the (many) marketing papers which exist. The interested reader should consult studies such as Eliashberg and Sawhney (1994), Sawhney and Eliashberg (1996), Neelamegham and Chintagunta (1999), Swami *et al.* (1999), Eliashberg *et al.* (2000), Edwards and Buckmire (2001), Swami *et al.* (2001), Ainslie *et al.* (2005), Krider *et al.* (2005), Elberse and Anand (2006), Hennig-Thurau *et al.* (2007a, b), Joshi and Hanssens (2009) etc. to become familiar with the research efforts of this discipline.
2. In saying these surveys only cover a limited number of studies on the industry is not to suggest that they are inferior as often the objective may be to focus on a particular topic which may extend beyond research focused solely on the industry itself. For example, De Vany (2006) and Walls (2008a, b) both cite much research on heavy tailed distributions which relates specifically to the models of movie demand which they have jointly developed over a number of years (see below) and each discuss in their respective survey.
3. Along with economists, researchers from other disciplines have also become increasingly interested in the motion picture industry over recent years – among others these disciplines include (most obviously) film studies, media and communications, management, sociology, psychology, mathematics and physics.
4. This section borrows from Litman (1998) and Vogel (2007).
5. See also Storper (1989) and Aksoy and Robins (1992).
6. Sedgwick and Pokorny (1998, 2005).
7. All of these papers and more are collated in De Vany (2004). Also, De Vany surmises much of this work in his chapter entitled ‘The Movies’ in the *Handbook of the Economics of Art and Culture* (Ginsburgh and Throsby, eds, 2006).
8. Walls (1997) and Hand (2001) also find increasing returns to information using Hong Kong and UK data sets, respectively.
9. De Vany (2004, Chapter 11) and McKenzie (2010) have used the related Pareto distribution to explain the careers of directors/actors and movie producers, respectively.
10. Wall Street Journal (2001) cited in Basuroy *et al.* (2003).
11. See also Weinstein (1998).
12. Einav and Ravid (2009) use release date changes in conjunction with stock market prices of the publicly traded studios of the films they represent to show that the market responds negatively to any news of a date change.
13. Blumenthal (1988), discussed above, and Gill (2007), discussed below, provide other exceptions.
14. Eliashberg *et al.* (2006, footnote 1) refer a related type of research using survey analysis as the ‘psychological approach’ and cite a number of papers in this respect. Whereas these studies typically investigate opinions, needs, moods, etc. in their survey design, Collins and Hand (2005) concentrate on economic variables in their approach.

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