The Economics of Movies: A Literature Survey

Jordi McKenzie[*]

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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 article attempts to fill this void and unify what is known about this industry. It will also identify and discuss potential areas for new research.

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Author's affiliation: Discipline of Economics, Merewether Building H04, University of Sydney, NSW, Australia, 2006. *Corresponding email:* J.Mckenzie@econ.usyd.edu.au

1 Introduction

Over the last two decades the motion picture industry has generated an 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 article seeks to provide a comprehensive and up-to-date survey of the literature which has emerged on the economic issues related to motion pictures and the motion picture industry. Although there have been a number of books written on the economics of the industry,[1] which between them reference much of the existing literature, there is only one known article which has provided a concise survey of the literature. Eliashberg, et al. (2006) provide a comprehensive survey on much of the academic literature written, but given the authors are primarily marketing scholars, they (obviously) focus their interests more in the marketing discipline, and in doing so relegate a number of the more economic orientated papers they discuss to a footnote. The current survey therefore focuses primarily on economic studies and in doing so, it is hoped, fills a void in the literature.[2] This also implies that this paper refrains from discussing (in detail) other disciplines' research efforts of recent years.[3]

The following section provides a discussion of the basic principles of production, distribution and exhibition. Section 3 provides a brief overview of the industry's history in relation to the studio era and the historic anti-trust cases of the late 1940s and early 1950s. Section 4 is the most extensive section and details literature which

[1] See, for example, Caves (200), De Vany (2004), Litman (1998), Moul (2005), Squire (1992), and Vogel (2007)

[2] There is something of a grey line 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, Eliashberg and Weinberg (1999), Eliashberg, Jonker, Sawhney and Wierenga (2000), Edwards and Buckmire (2001), Swami, Puterman and Weinberg (2001), Ainslie, Dreze and Zufrden (2005), Krider, Li, Liu and Weinberg (2005), Elberse and Anand (2006), etc. to become familiar with the research efforts of this discipline.

[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.

can be broadly categorised 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 5 surveys research with a more 'macroeconomic' focus where, for example, aggregate patterns of cinema attendance (rather than individual film attendance) are the unit of analysis. Finally, Section 6 provides a concluding discussion and suggests some directions for future research.

2 Film Financing, Production, Distribution and Exhibition 101[4]

A feature film may begin its life in a number of ways. A producer may buy (or option) a screenplay, buy (or option) a book to adapt into a screenplay, may hire a writer to develop an idea, or may have a writer make a submission of a screenplay to them without solicitation. The price (or option price) paid for a screenplay may be a cash payment and may contain contingent compensation as well. The producer will then seek financing, which may be from a studio/distributor financier, an independent financier, private equity investors, or (in some cases) from an external funding body. The producer may acquire financing based solely on the script and the employment of their services (known as a 'mini-package') but in many cases it is necessary to attach a director and/or key cast members (known as a 'major-package') in order to sell the package. Generally speaking, the further the project is developed, the higher price the producer will likely receive for the package. Other potential sources of financing may also be obtained by selling off distribution rights in certain markets, or arranging a 'negative-pickup' where a completion guarantor, willing to back the ultimate cost of the project, can secure a studio's involvement who will provide an agreement to provide the 'pick-up' (residual cost) on delivery. The pick-up can then be taken to a bank and transferred to cash.

Once the film is completed, and if it has been completed without the assistance of a studio, the producer will require the services of a distributor. If the film is of high quality the producer might be able to sell it for the negative cost (budget), or even more generating an immediate profit. Usually the producer will also seek some percentage of revenues which will typically be specified once the distributor has

[4] This section borrows from discussions such as Squire (1992), Caves (2000), and Vogel (2007). The interested reader is referred to these sources for a more thorough exposition.

deducted their costs (prints and advertising). There are various combinations and a 50/50 split is common in instances where the studio has part financed production, but in instances where the studio is hired simply as a distributor a smaller distribution fee, 33% for example, is likely.

Once distribution services are arranged, the film then goes to exhibitors. Film distributors typically charge fees as percentages of box office revenues rather than a flat fee. Since the Paramount decrees (see below), negotiation between distributors and exhibitors in the U.S. (and many other countries) is on a film-by-film, theatre-by-theatre basis having consideration to such things as the film, advertising support, release season, competitive environment, geographic market, etc. There are a number of variations to the basic exhibition contract. In some countries, such as the U.S., exhibitors may first deduct fixed expenses (known as the 'house-nut') before dividing box office revenues with the distributor. The share division then changes over weeks of the film's run, with a smaller share for the distributor in later weeks. This structure recognises the exhibitor's opportunity cost of screening alternate titles and that films are typically more popular closer to the opening. With the house-nut payment as part of a contract, the distributor might keep as much as 90% of revenues in the first week, but without the fixed payment the distributors share is likely to be significantly less, for example 55%.

It is also common in exhibition contracts to stipulate weekly session requirements, and a minimum number of weeks for which the film must screen. After expiration of the minimum run period (if imposed), the run automatically continues as long as box office is sufficient to warrant it. Sometimes there may be a contractual provision, known as a 'hold-over clause' which requires the exhibitor to hold over a title provided that box office revenue has exceeded some predefined amount. Distributors are usually precluded from specifying a price for admissions in the exhibition contract which creates an incentive problem because exhibitors are likely to prefer a lower price than exhibitors given the high profit margins they earn on drinks and popcorn. There are also features in the exhibition contract which may influence the exhibitor's profit but may not necessarily be specified in the exhibition contract. Specifically, the size of the local market allotted to the local cinema is an issue that may become contentious for the distributor/exhibitor relationship should the exhibitor not be assigned a ‘clearance’ area which may be either a window of time, or a spatial area over which the chosen cinema will have sole monopoly over the screening. Although admission price setting and clearances have been briefly discussed in relation to the contemporary form of the exhibition contract, as discussed below, they have a long history in the economics of the industry.

3 Some History[5]

The history of the motion picture industry goes back to Edison’s invention of the kinetograph (motion picture camera) and kinetoscope (viewing machine) in 1894. About 10 years later, once projectors had been invented and stories were developing ‘nickelodeon’ theatres began screening series of short ‘one-reel’ films which typically included a selection 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 two years later, however, the explicit nature of such practices were 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 only sharing films amongst their own theatres. 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. It 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

[5] This section borrows from Litman (1998) and Vogel (2007).

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.[6] 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 organised 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 – that is 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 don't 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 1937-38 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

[6] See also Storper (1989) and Aksoy and Robins (1992)

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. That is, 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.

Blumenthal (1988) provides a useful empirical examination of blind-selling – a practice which, although banned by the U.S. 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 U.S. 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,[7] Pokorny and Sedgwick (2009) examine the profit trends in Hollywood using data from the 1930s and 1990s. The 1930s data they examine is actual studio ledger data from MGM, RKO and Warner Bros. covering 1,796 films; whereas the data from 1990s is standard Nielsen EDI covering 2,116 films. These authors develop a measure of profit which includes actual rental incomes, distribution costs, and production costs in the 1930's sample.

[7] Sedgwick and Pokorny (1998) and Sedgwick and Pokorny (2005).

They also compensate for ancillary revenues in the 1990's 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). 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 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.

4 Movie Microeconomics

4.1 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. Although statistically significant and intuitive results are frequently obtained, there is a growing realisation 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 U.S. 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.

A more recent study to examine 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 U.S., France, Germany, Spain, and U.K 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 U.S. 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, whilst 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 U.S. 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.[8] 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'.[9]

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 week's 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 utilises 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

[8] 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 Ginsburgh and Throsby (2006).
[9] Walls (1997) and Hand (2001) also find increasing returns to information using Hong Kong and U.K. data sets respectively.

English and finds opening week revenue positively impacts on life-length whilst 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 2,015 motion pictures released between 1985 and 1996. They show that the revenues are Levy distributed (in the class of stable distributions) 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 ten weeks) is the most important variable in determining box office revenues. Consequently, they reject forecasting models of box office revenue.

Utilising 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, Hand and Snell (2002) also examine the statistical revenue distribution of a sample of 216 films released in the U.K. 1998-99 and similarly show that film revenues in their sample are characterised 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 characterised 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 1,989 films released in the U.S. between 1985 and 1996. His basic regression structure models revenue as a function of budget, star power, sequel, opening screens where the disturbance term follows a (log) skew-normal, or (log) skew-*t* distribution. He compares the results to standard log-linear model and minimum absolute deviation model (MAD). The statistical evidence of skewness and heavy tails 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 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 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.

Moul (2007) also investigates the word-of-mouth effect and its consequences on demand by instead using a discrete choice (nested logit) model of demand where word-of-mouth presents through the heteroskedasticity and serial-correlation in the error term of the model. His panel data set covers 1,602 titles reported in *Variety*'s weekly top 50 from 1990-1996. The results of his 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 capitalise 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 characterised by thick right tails that are more extreme than a log-normal distribution and have theoretically infinite variance. Using a sample of 2,429 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 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 (U.S. revenue and critical reviews), and strategic distribution variables (previewing, advertising, opening week screens, and release gap with the U.S. market). Using data on 360 wide-release film released over the years 2000 to 2005, he provides evidence that box office life-length responds to previewing, advertising, critical reviews, and U.S. box office – but not to production budget, star power, or opening week screens.

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 ‘why’ stars play such an important role in the movie business.

Albert (1998) examines the role of stars and argues that whilst 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 Herbert Simon’s (1955) derivation of firm size growth, which is also related to De Vany and Walls (1996) model of revenue dynamics. 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) – that is 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. Using GMM Heteroskedasticity and Autocorrelation Consistent (GMM-HAC) 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, subsidisation, 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 – that is, in addition to their individual effects. They also find no evidence of subsidisation, 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’ – that is 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 (U.S) 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 (where the maximum was 15 for *Cape Fear*), 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).

Following work of De Vany (2004, Chapter 11) on actors and directors, McKenzie (2009b) has shown the same class of distribution (i.e. Pareto type) applies to the careers of movie producers using a stratified sample of 101 movie producers of all the films released over 2007.[10] This technique provided a total sample of 839 films dating as far back as 1978. He considers the number of films (co)produced by each producer, and the sum of box office revenues attributed to them. He demonstrates that each distribution is extremely right skewed and characterised by theoretically infinite variance. His results show that a producer is more likely to produce another film the greater the number of films they have already produced. He also shows that an early career producer faces more chance of securing a film through pure luck (e.g. a coin-flip), but that the probability of producing further films is increasing in the number of films previously produced.

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 U.S., 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.[11] In a contribution that generated a number 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 patronise. The methodological framework they present is that the influencer's reviews should correlate more with early box office

[10] The findings are also comparable to the results of Albert (1998) discussed above.
[11] Wall Street Journal (2001) cited in Basuroy et al (2003).

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 U.S. data from 1991-92 on weekly revenues, and review data from *Variety* which classified reviews as 'pro', 'con', or 'mixed'. In total their data set covers 2,104 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, Chatterjee and Ravid (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 have a sample of 172 films observed by 141 critics with a mean (median) of 33.6 (17) films reviewed by each critic. 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, Wald and Basuroy (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, Van Oostrum, and Leenders (2007) also investigate the predictor vs. influencer effect with a specific focus on art-house films vs. 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 vs. 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 of over their sample period with a nationally syndicated TV show. Reviews are categorised 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 U.S. market. They characterise identity as being dependant upon the type of critic who reviewed it and characterised it as being ‘fit for the mass market’. That is, when a critic who specialised 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 of the role of 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 1950-1970 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 lesser extent Oscars) are short lasting as films don’t 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 another study concerned with quality assessments of motion pictures Holbrook (1999) looks at the popular appeal vs. 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 (HBO) 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.

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 main stream economic journal, Smith and Smith (1986) investigate a sample of film rentals (i.e. revenues retained by the distributor) 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. Their 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 detailed study by Nelson, Donihue, Waldman, and Wheaton (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 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 five 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, which they liken 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, Adjamah and Pauly (2005) also examine the effect of Academy award nominations and awards on movies’ financial success by considering a sample of 2,244 movies (32,040) observations released in U.S. 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. The employ two models: 1) Examine the effect on weekly revenues assuming the effects don’t 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 don’t 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. The results of their analysis show 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.

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*revenue – budget) across the same sample of 2,015 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 75^{th} 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 audiences 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, whilst films with violent or sexual content do not necessarily increase profitability, they lose money less often. They also provide evidence of sales maximisation, rather than profit maximisation, 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).

4.2 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.[12] 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 and in total 118 payment schemes were 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

[12] See also Weinstein (1998).

covering the years 1959-89. 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 (marking) 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 divisionalised firms act like fully integrated firms or competing individual firms. His data set examines the release dates of films in 1995-96 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 ten 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 film's 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 don't achieve efficient outcomes if they do not share the same distributor. He also extends the model to investigate at the role of divisionalisation (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 divisionalised 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.

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 1,305 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 – e.g. 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 alternate 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, Ravid and Reisel (2008) also explore co-financing and develop a project-level data set of 275 films produced by the 12 major distributors to investigate the practice. 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) Specialisation hypothesis (will specialise 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. Whilst 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 vs. non-co-financed) which leads to rejection of the specialisation 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 subsidisation) 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 by either i) 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 subsidisation may relax the incentive to increase earnings over expenditures because (the state) pays the difference. Whereas 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 maximisation 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, whilst 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.

4.3 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 equilibriums may emerge: 1) A single equilibrium where both film 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.

Einav (2007, 2009) further investigates the relationship between seasonality and the release timing decisions of distributors. Einav (2007) investigates a sample of wide-release movies released in the U.S. market between 1985 and 1999 (covering 1,956 titles) to explore the notion of underlying vs. 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 2/3 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’. 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 (five 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 (2009) focuses on other aspects of the distributor’s problem with respect to weekly (national) screen allocations and advertising decisions. He uses a ‘principles of differentiation generalized extreme value’ (PDGEV), which is 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 size advertising 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.

4.3 Exhibition

The exhibition industry also offers much scope for economic investigation and, in particular, applying the techniques of empirical industrial organisation to understand its structure, conduct, and performance. In a series of papers, Davis (2005, 2006a, 2006b) considers a number of issues pertaining to the practices, structure, and spatial characteristics of the U.S. motion picture exhibition industry over the years 1993-97. 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 substantiative data set, which covers 56,729 pricing points from a total of 5,743 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 don't share revenues.

In subsequent research, Davis (2006a) again uses a five year sample of theatre revenues over the years 1993-97 to examine: 1) Incumbent rivals' revenues (business stealing), 2) Own-firm revenues at existing theatres (cannibalisation), 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 U.S. 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 localised to about 15 miles around a theatre location, but finds little evidence of cannibalisation 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).

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 same set of films).

Orbach and Einav (2007) also consider cinema ticket prices in a recent study of the U.S. market and evaluate potential economic reasons for the (almost) uniform pricing practices of 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 categorised 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) 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) 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 marginalisation (which could be internalised with vertical integration). Their conclusions are that exhibitors could increase profits if they practiced 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 (cannibalisation) 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, Switzer, and Besocke (2005) provides an exception.[13] 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 minimisation helps explain the typically observed declining share structure. The study employs a data set of 2,769 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 utlising 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, U.S. 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.

[13] Blumenthal (1988), discussed above, and Gill (2007), discussed below, provide other exceptions.

5 Movie Macroeconomics

A number of studies have taken a macroeconomic perspective in considering the film industry and have examined the effect of a range of policy, economic, and social changes on aggregate patterns cinema demand (and supply). In a series of papers, Cameron (1986, 1988, 1990, 1999) examines at the demand and supply of cinema at the aggregate level in the U.K. Using monthly data on cinema admissions, prices, incomes and television licences, Cameron (1986) notes that the U.K. cinema industry had been in a state decline since 1957 which may in part have been due to higher ticket prices and substitution towards other goods (e.g. television). 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 maximisation 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 (auto-regressive integrated moving average) model to investigate a data set of annual British cinema admissions from 1936-1999. The ARIMA specifications employed are (1,1,1), (2,1,0), and (0,1,2) – where (a,b,c) denotes the order of a) auto-regression, b) integration, c) moving average. He truncates the last three 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. one 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 1950-87. 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 2SLS and SURE 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 monopolised 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.

Cuardrado and Frasquet (1999) also consider the Spanish market and examine the growth of multiplexes and the effects on cinema demand. Using survey analysis of 505 Spanish 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 specialising in non-Spanish films having appeal to cinema buffs.

Collins and Hand (2005) also consider a survey approach to looking at aggregate patterns of cinema attendance. They investigate the cross-sectional probability that individuals will go to a movies (in last two months) using individual level data reported in the 'Cinema and Video Industry Audience Research' (CAVIAR) survey.[14] 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. Whilst they don't observe price they contend that variation in ticket prices may effect 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,

[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 theses studies typically investigate opinions, needs, moods, etc in their survey design, Collins and Hand (2005) concentrate on economic variables in their approach.

suggesting the sample of films over the two month sample time didn't appear to be biasing results in any systematic fashion.

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 1961-88, 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 U.S. 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 (1982-84 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 U.S. movie industry.

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 U.S. 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 U.S. 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.

Scott (2004) examines the structure of the U.S. distribution market over the period 1980-2000, focusing on the role of independents, majors, and subsidiaries of majors. His descriptive statistics suggest that whilst 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 U.S. government.

6 Concluding Comments and Directions for New Research

The motion picture industry certainly offers economists many interesting puzzles – particularly for applied researchers. Whilst 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 realisation, 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. Empirical industrial organisation 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.[15] 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.

[15] There is relatively little known about the impact of piracy on the industry. De Vany and Walls (2007) provide a recent exception and estimate the losses of a typical studio movie to be approximately US$40m when there is a pre-release or simultaneous release on the internet with the theatrical release.

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