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Profitability trends in Hollywood, 1929 to 1999: somebody must know something[1]

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This article presents an overview of the development of the US film industry from 1929 to 1999. Notwithstanding a volatile film production environment, in terms of rate of return and market share variability, the industry has remained relatively stable and profitable. Film production by the film studios is interpreted as analogous to the construction of an investment portfolio, whereby producers diversified risk across budgetary categories. In the 1930s, high-budget film production was relatively unprofitable, but the industry adjusted to the steep decline in film-going in the postwar period by refining high-budget production as the focus for profitability.

Based upon the returns of films generated in the North American market during the 1980s and 1990s, De Vany and Walls have demonstrated powerfully, over the course of a series of articles, that the distribution of returns to film production are stable, yet highly skewed, with thick right tails, and are characterized by infinite variance, meaning that the outcome of the film production process, whether measured in terms of box-office revenues or profits, is essentially unpredictable.[2] In a rare convergence between the rigour of academic analysis and the hyperbole of Hollywood, these authors therefore provide compelling support for the screenwriter William Goldman's throwaway line concerning the profitability of film production that 'nobody knows anything', elevated by Caves to the 'nobody knows' principle.[3]

However, if it is the case that the film production environment can be characterized as being unpredictable, then the central issue is the nature of the strategies that film producers have developed to deal with this unpredictability. For the fact is that Hollywood has consistently dominated global film production for nearly a century, is manifestly a profitable industry (although it has been subjected to marked profitability cycles), and perhaps most surprisingly, has been dominated by a stable core of film studios/producers/distributors, albeit with regular changes in ownership. While it might be argued that Hollywood is not a 'normal' industry, the demand volatility experienced by its outputs is certainly not unique. The key

[1] The authors would like to acknowledge the input of Richard Maltby and Bernard Hrusa Marlow into the development of this article. Two anonymous referees also made a range of observations/suggestions that improved the article's focus, including the rigour of the estimation methods described in the appendix.

[2] See De Vany and Walls, 'Bose-Einstein dynamics'; De Vany and Walls, 'Motion picture profit'; Walls, 'Modelling movie success'.

[3] See Caves, *Creative industries*, p. 3. Goldman's (*Adventures*) comment (regularly repeated in the book) was made first on p. 1.

to understanding Hollywood is to understand how it deals, and has dealt, with the risks born of uncertainty.[4]

Accordingly, the first dimension of our approach is the mitigation of risk. We argue that an appropriate framework for interpreting the process of film production is that of portfolio theory, broadly defined. Portfolio theory, developed within the context of the construction of investment portfolios, has clear implications for the manner in which a film studio might decide how its aggregate film production budget can be spread across a range of film projects. Each of these projects can be interpreted as exhibiting differing levels of risk (at the simplest level, more expensive film projects will tend to be the riskier ones, by virtue of the fact that they have to attract larger audiences to break even). Hence the challenge for the studio is to construct a 'portfolio' of film projects, in which a balance is achieved between the overall risk on the portfolio (exploiting the risk-reducing property of an appropriately constructed portfolio), and the expected return on the portfolio.

This reasoning is consistent with Conant's depiction of Hollywood as a cartel, controlling the quantity and velocity of industry supply through in-house distribution.[5] It was this perception of the industry that resulted in the US Supreme Court ruling in 1948, in response to an action brought by a number of independent film exhibitors, that the established film distribution practices of the major studios were anti-competitive. These practices included the 'block' booking of films whereby theatres were compelled to contract for blocks of films, generally with no opportunity to view any of these, rather than selecting preferred films for exhibition. Associated practices specified lengths of run and the manner in which films cascaded down the distribution chain. The so-called Paramount judgement, or Paramount Divorcement Decree, compelled the studios to divest themselves of their cinemas and also prevented them from becoming television broadcasters.[6] Writing in 1960 about these Supreme Court hearings, Conant argued, 'The major combination among the eight distributor defendants was on the output side, the licensing of films to exhibitors. Their organized control of the distribution market was so effective that the court found substantial proof of monopoly among them. It also found an intent to exercise this monopoly power'.[7] Conant's explanation for this industry structure is the same as our own; that it should be understood within the context of 'market uncertainty' and that the basis for this was that 'Consumer reaction to any particular film is unpredictable', from which it follows that industry structure and the organization of film investments into annual studio portfolios are essentially two sides of the same coin, predicated on the stochastic but random nature of film returns.[8] Indeed Sidney Kent (as managing director of Fox), when testifying before a subcommittee of the House of Representatives in 1936, commented, 'We have to live by our averages. If a man making motion pictures, the best

[4] Throughout this article, we use the concepts of risk and uncertainty interchangeably. Given the infinite variances that characterize film returns, risk is not understood as a state in which the probabilities associated with the performance of any one film can be known.

[5] See Conant, *Antitrust*, pp. 1–3.

[6] It has been subsequently argued that the Supreme Court misunderstood the economics of film distribution and that its decision did little to alter the competitive environment of film distribution, and if anything may well have harmed the industry as a whole. See, for example, Hansen, 'Block booking', and De Vany and Eckert, 'Motion picture antitrust'.

[7] See Conant, *Antitrust*, p. 48.

[8] Ibid., p. 1.

producer, if he makes one hit out of three, he would have a tremendous batting average . . . But you know, our best men, when they go out and actually try to make pictures, frequently make failures'.[9]

A consequence of the commercial importance, but unpredictable nature, of 'hit' production is that the film industry is geared to respond elastically to audience preferences, as manifested through the box office.[10] In the years before the Supreme Court's Paramount Divorcement Decree, this meant that the film 'hits' of one studio were not exclusively screened at in-house cinemas, but in the cinemas of rival studios as well.[11] Thus the industry was, and continues to be, geared to revenue maximization strategies, with each studio striving to produce films that attracted very large audiences. The constant replenishment of industry supply with new films (products) belies the steady state statistics of industry concentration levels, characterizing an industry in constant competitive ferment, a process made more intense historically with the dramatic demise of audiences for middle-budget films during the 20 years following the end of the Second World War.[12]

The second dimension of our approach is outlining the historical context. We trace the evolution of Hollywood, and its strategic approach to film production, from the 1930s to the 1990s. We draw on a very comprehensive microeconomic dataset for the 1930s, and compare and contrast the conclusions drawn from these data with the conclusions drawn from a comparable dataset for the 1990s. We also draw on a more limited dataset for the 1940s to the 1960s, which allows conclusions to be drawn about the manner in which Hollywood transformed itself from the institutional structure that was a response to the socio-economic environment of the 1930s to that of the very different environment of the 1990s. These analyses are further supplemented with a number of macroeconomic datasets. All analyses refer exclusively to the North American market for film.

Over the 70-year period covered by this study, we find an industry in which the distribution of revenues has become more unequal and the level of profitability associated with big-budget productions has increased. Our results for the contemporary period are predicated upon knowledge that the North American market for theatrical releases generates a small fraction of film revenues. This leads us to suppose that somebody in the film business must know something, and that in order to understand the risks faced by Hollywood the unit of analysis should not be the individual film title, but rather the portfolio of productions distributed and/or (part-)produced and/or (part-)financed by the major studios.

This article is structured as follows. Section I introduces the datasets and presents a method for estimating profits in the industry during the 1930s and the 1990s. It also provides a broad summary of our findings. This is followed in section II by an overview of the macroeconomic environment within which Hollywood developed and evolved. In section III, a periodized account of Hollywood's industrial history is presented, based upon how the major studios responded to changes in the macroeconomic environment, and is followed in section IV by a detailed

[9] US Congress, *Hearing before a subcommittee*, p. 247.
[10] See De Vany and Walls, 'Bose-Einstein dynamics', pp. 1494–7.
[11] See Sedgwick and Pokorny, 'Film business', pp. 90–3.
[12] See De Vany and Lee, 'Stochastic market structure'.

discussion of the competitive environment of the industry, the role that risk plays in the strategic planning process, and the implications that this has had for market structure. A final section draws a number of conclusions.

I

The data upon which our analysis of the 1930s is based, consisting of all the 1,796 feature films distributed by MGM, RKO, and Warner Bros. over the period 1930–42, are derived directly from the studios' own accounting ledgers. This dataset provides figures for the distributor rentals that each of these films generated (domestic and foreign), their production costs and, for MGM and RKO, the profit generated by each film.[13] The dataset for the 1990s covers the period 1988–99, and was supplied by AC Neilsen/EDI Inc., the standard source for contemporary film industry data.[14] It includes the North American box-office revenues of all 4,164 films released onto the North American market between 1988 and 1999, together with estimates of the production costs for 2,156 of these films. In the analyses that follow, only those films estimated to have cost $1 million or more have been used.[15] This truncated dataset consists of 2,116 films.

Figures 1 and 2 present simple scatters of film revenues against production costs, in constant prices, for the two data periods (1929 prices are used for the 1930s dataset, and 1987 prices for the 1990s). The revenue data for 1930 to 1942 are the US rental incomes received by the studios (MGM, RKO, and Warner Bros.) but for 1988 to 1999 they are the total North American box-office revenues.

Although the datasets are some 50 years apart, the two scatters show remarkable similarities—higher-cost films tend to generate higher revenues, but higher-cost films also exhibit considerable variability in their revenue performances. Figures 1 and 2 emphasize that this has been a constant characteristic of film production. In other words, while in general high revenues tend to be derived from films with substantial production budgets, high production budgets are by no means a guarantee of high revenues. It is this aspect of the film production process—the uncertain and highly volatile relationship between film budgets and film revenues—that can be interpreted as reflecting the 'nobody knows' principle.

Although figures 1 and 2 are useful for illustrating the general financial environment of film production, they are somewhat misleading in that they fail to emphasize the profitability dimension. Film producers/distributors will of course be concerned primarily with the profits and rates of return that their films generate, irrespective of the revenues generated. Certainly contemporary Hollywood, while very open about the box-office performance of its films, is much more secretive about profitability. In the analyses that follow, it has therefore been necessary to employ a range of estimation methods to derive profitability data.

[13] These data are derived from the complete Eddie Mannix (MGM), C. J. Trevlin (RKO), and William Schaefer (Warner Bros.) ledgers. The ledgers are partially reported and analysed in Glancy, 'MGM film grosses'; idem, 'Warner Bros. film grosses'; and Jewell, 'RKO film grosses'. We are grateful to Mark Glancy and Richard Jewell for making the complete ledgers available to us.

[14] The data were supplied by the London office of AC Nielsen/Entertainment Data International Inc, and were extracted from their historical database.

[15] Just 40 of the 2,156 films were estimated to have cost less than $1 million, and, given the specialized nature of these films, they have been omitted from all subsequent analyses.

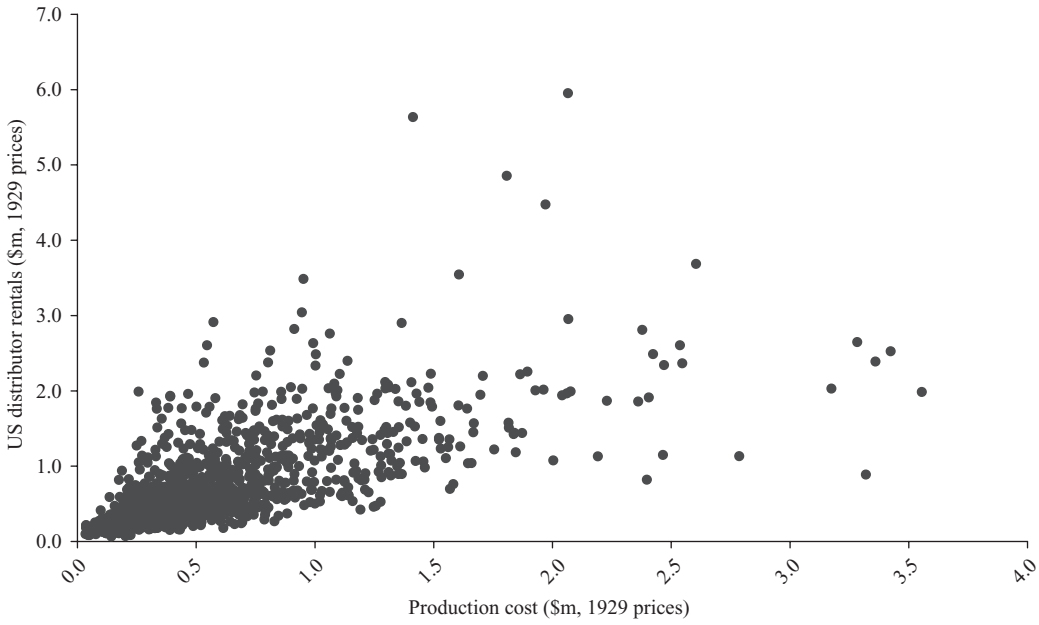

Figure 1. *Scatter of distributor rentals against film costs, 1929 prices, 1930–42*
Source: Eddie Mannix (MGM), C. J. Trevlin (RKO), and William Schaefer (Warner Bros.) ledgers (see n. 13).

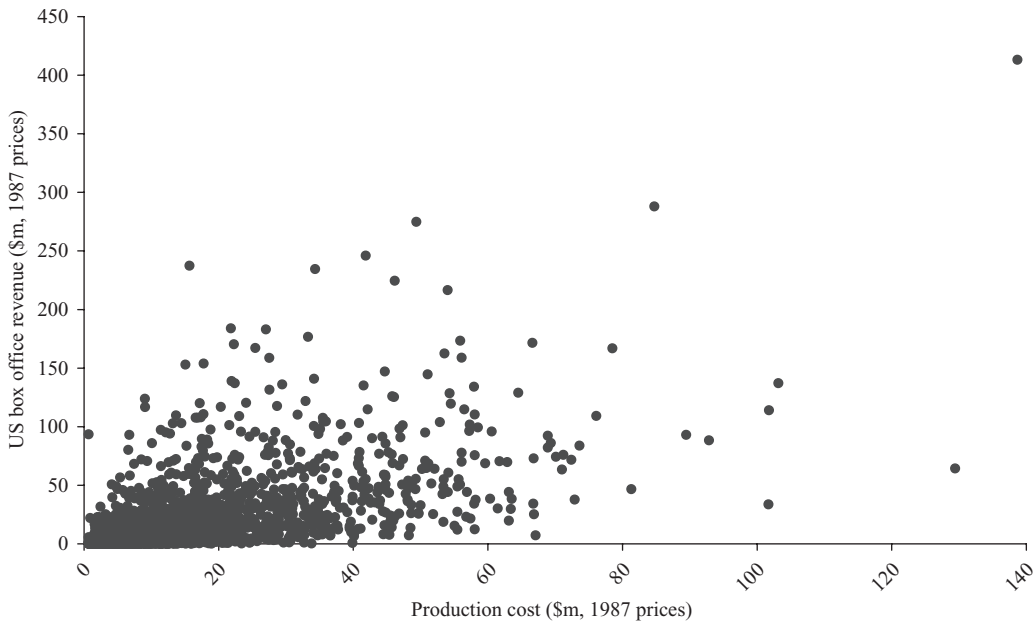

Figure 2. *Scatter of box-office revenues against film costs, 1987 prices, 1988–99*
Source: AC Nielsen/EDI dataset.

The 1930s dataset contains incomplete data on profitability. For both MGM and RKO, the ledgers indicate the distribution costs/profits generated for the studios by each of their films, but for Warner Bros. the data are available only on production costs and distributor rentals generated by each film. However, assuming a direct relationship between a film's distribution costs and its production costs and rental income, the MGM and RKO data can be used to estimate this relationship, and thereby provide a means for estimating distribution costs and hence film profits for Warner Bros., with some degree of confidence. As the 1990s dataset only contains comprehensive data on North American film revenues, the film profits for the 1930s were further adjusted to reflect the profits that could be attributed to North American release only, so that the two datasets could be compared directly. Deriving profitability data for the 1990s dataset is somewhat more problematic. In contrast to the 1930s dataset, the 1990s dataset does not contain any information on film profits, and hence all profitability data for the 1990s have had to be estimated. The approach used here derives directly from the methods employed to estimate Warner Bros. film profits in the 1930s, but also incorporates information from other sources about film profits during the 1990s. In addition, an attempt is made to estimate profits that are attributable to North American theatrical release only, and therefore to adjust for the profits that are made in all ancillary markets. This is a novel approach and leads to conclusions about Hollywood profitability in the 1990s that are strikingly different from contemporary wisdom. The details of the estimation methods employed are outlined in an appendix.

A scattergraph of film profits against production costs for the 1930s is shown in figure 3, which, for contextual purposes, also indicates the profits of some of the

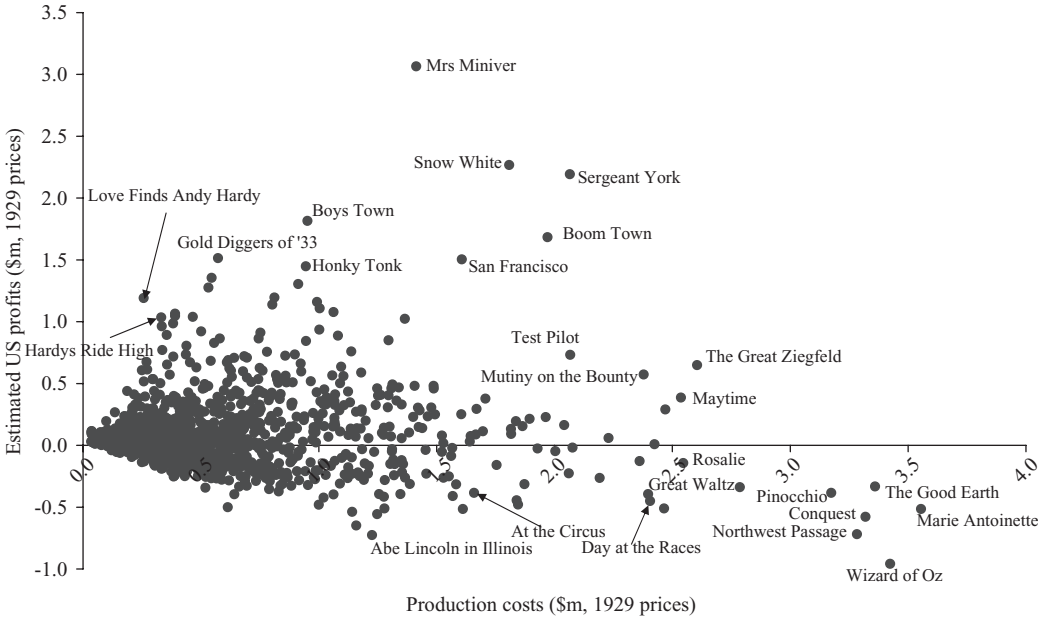

Figure 3. *Scatter of US profits against film costs, 1929 prices, 1930–42*

Source: As for fig. 1, but profits estimated for Warner Bros. films, using methodology described in app.

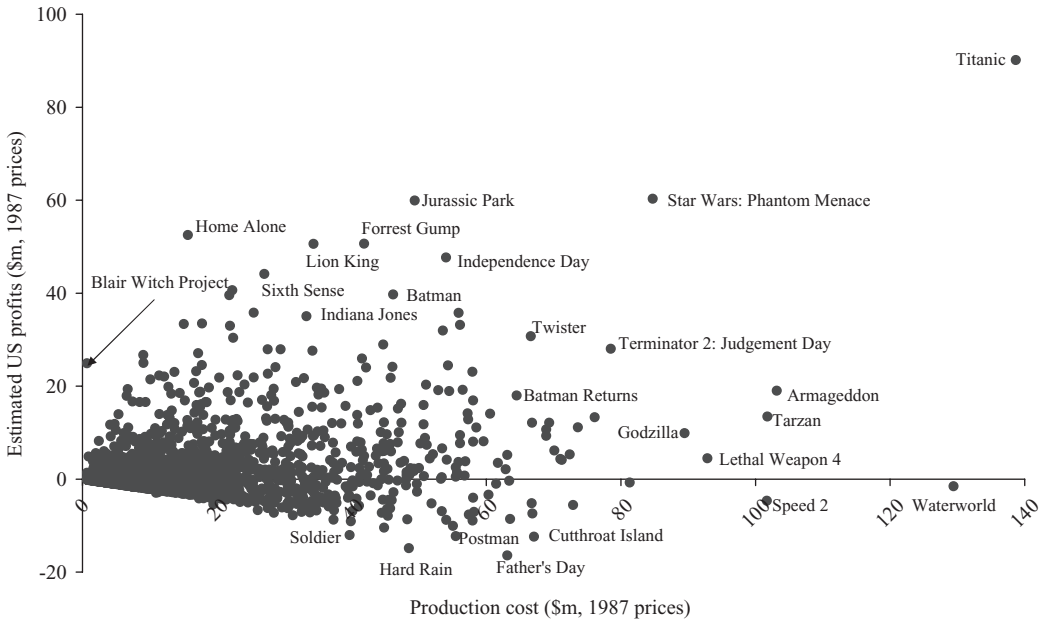

Figure 4. *Scatter of US profits against film costs, 1987 prices, 1988–99*
Source: As for fig. 2, but profits estimated for Warner Bros. films, using methodology described in app.

better-known films of the time.[16] The main features of this graph are the tendency for the variability in profits to increase as production budgets increase and the incidence of loss-making high-budget films. Indeed, of the 25 films that cost in excess of $2 million, just 10 generated profits in the US market. Thus figure 3 emphasizes the nature of risk associated with film production in the 1930s. Clearly there was considerable variability in film profitability performance. But high-budget production was subject to additional risks, arising from the variability of the profits of high-budget films and the higher probability of high-budget films generating substantial losses. So if we consider all films produced over the period, we find that 66 per cent of these generated profits in the US market. However, if we consider the most expensive 25 per cent (films costing more than $0.59 million), then just 58 per cent of these made profits, compared to the 69 per cent of the remaining films that were profitable.

Figure 4 presents a scatter of estimated US profits derived from theatrical release against production costs, for the 1990s, generated by the 2,116 films in the dataset (again, with a number of film titles indicated). Broadly, this graph reproduces the features of the 1930s—increasing variability of profits as costs increase. However, a notable difference is the proportion of profit-generating films. During the 1990s, just 42 per cent were profitable (this rises to 50 per cent if we just consider the 1,458 films produced by the major studios/distributors during the

[16] *Snow White and the Seven Dwarfs*, although produced by Disney, was distributed by RKO. This was also the case for *Fantasia*, *Dumbo*, and *Pinocchio*, which are also included in the dataset.

1990s[17]), compared to 66 per cent of films during the 1930s. If we consider the most expensive 25 per cent of films produced in the 1990s, 56 per cent of these were profitable (59 per cent for those of the majors), broadly comparable with the 58 per cent of such films that were profitable in the 1930s. However, of the remaining 75 per cent of films just 37 per cent were profitable in the 1990s (47 per cent for the majors), compared to 69 per cent during the 1930s. But at the other extreme—the most expensive 5 per cent of films produced—70 per cent of these were profitable in the 1990s, compared to just 53 per cent of these films being profitable in the 1930s.

Sedgwick and Pokorny analysed the financial performance of Warner Bros. during the 1930s and argued that the manner in which Warner Bros. allocated their aggregate annual film production budgets, across a range of film projects, could be interpreted as analogous to the construction of an investment portfolio.[18] High-budget films constituted high-risk investments that were capable of generating substantial profits, or delivering season-tarnishing losses. Medium- and lower-budget film production was a much more stable source of profits, and in effect cross-subsidized high-budget production—the profits earned from lower-budget production allowed for the flexibility to invest in high-budget films with high production values, to satisfy the increasingly sophisticated tastes of the regular film-goer. But in aggregate these high-budget films only generated modest rates of return, as can be inferred from figure 3.

By contrast, the major source of profits during the 1990s was high-budget production, with lower-budget production representing a much more uncertain alternative. Indeed, lower-budget production in contemporary Hollywood is perhaps best interpreted as providing a means for identifying and developing talent that can be exploited subsequently in high-budget production.[19] Furthermore, risk spreading/diversification is a much more explicit element of investment strategies in contemporary Hollywood; while the major studios are still dominant investors in film production and distribution, they are not the sole investors, regularly acting as entrepreneurs in putting together those nexus of contracts that bind talent to productions. Indeed, Hollywood now offers extensive opportunities for individuals/organizations to invest in film production, thereby allowing such investors to construct their own diversified investment portfolios, of which film production is but a component, presumably at the riskier end of the spectrum. Additionally, the major studios can be interpreted as being involved in a further process of risk diversification, across theatrical and ancillary markets, and across the divisions of the diversified conglomerates of which the major studios are now a part.

[17] A 'major' distributor is defined as a distributor for which cost data are available for 50 or more of its films over the data period, and for which these costs are available for at least 70% of its films. The distributors that fall into this category are Buena Vista (cost data available on 202 films), Columbia (81), MGM/UA (125), New Line (101), Orion (53), Paramount (161), Sony Pictures (122), TriStar (67), Twentieth Century Fox (157), Universal (165), and Warner Bros (224). This accounts for 1,458 films, 69% of all the films for which cost data are available. The one large distributor excluded is Miramax—cost data are available on 148 of its films, but this only accounts for 55% of its output, and consequently such coverage was considered as being potentially unrepresentative of its output. However, Miramax was included in the analyses of film revenues and number of film releases, as was Dreamworks, a distributor that distributed just 14 films over the data period, but these were films with high production budgets and high revenues.

[18] Sedgwick and Pokorny, 'Risk environment'.

[19] Of course, this was also true for actors and directors working in the major studios' low-budget pictures in 'old' Hollywood.

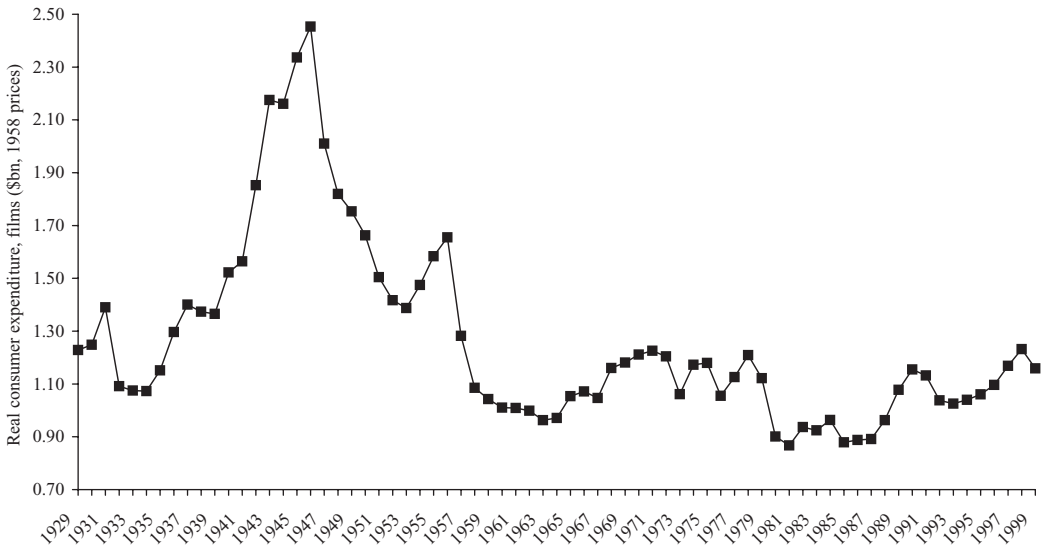

Figure 5. *Real consumers' expenditure, films ($m, 1958 prices), 1929–99*
Source: Vogel, *Entertainment industry economics*, tab. S1.1, p. 382.

In order to gain a more detailed understanding of the transformation of Hollywood from the tightly structured studio system of the 1930s to much more open and flexible contemporary configurations, it is useful to look at a number of broad trends to which Hollywood has been subjected.

II

Figure 5 shows consumers' real expenditure on film-going (1958 prices), from 1929 to 1999.[20] The notable features of these data are the rapid growth in consumer demand throughout the 1930s and 1940s, after the relatively short-lived impact of the depression, a similarly rapid decline in the immediate postwar period, and then recovery and slow, although somewhat inconsistent, growth from the early 1970s. Similar trends are reflected in the numbers of films released onto the US market (data not shown). Thus in terms of both consumers' expenditure and total film releases, the mid-1930s and early 1940s represented the 'golden period', with a marked decline in the postwar period and slow recovery from the early 1970s.

Although figure 5 emphasizes the rapid decline in the industry in the postwar period, it somewhat understates the recovery of the industry from the 1980s. Total film releases more than doubled between 1980 and 1999, and increased by 40 per cent from 1988 to 1999. However, the average cost of film production also increased markedly over this period, implying that the value of output increased considerably more than the volume of output. While the industry is notoriously secretive about production cost information, some data are available, albeit in a

[20] See Vogel, *Entertainment industry economics*, tab. S1.1, p. 382. These data measure consumers' expenditure on film-going, and are derived directly from expenditure on admission tickets.

Table 1. *Number of releases by majors and real average production costs, 1929/30 to 1941/2 and 1988 to 1999*

Year	*Number of releases (majors)*	*Average cost ($m, 1929 prices)*	*Year*	*Number of releases (majors)*	*Average cost ($m, 1987 prices)*
1929/30	356	0.31	1988	165	11.9
1930/1	307	0.41	1989	165	13.6
1931/2	300	0.39	1990	169	16.3
1932/3	317	0.37	1991	181	15.7
1933/4	350	0.40	1992	163	18.6
1934/5	340	0.43	1993	179	16.7
1935/6	348	0.43	1994	178	23.0
1936/7	393	0.52	1995	185	23.2
1937/8	346	0.59	1996	194	23.2
1938/9	367	0.56	1997	175	29.3
1939/40	348	0.66	1998	180	28.1
1940/1	368	0.52	1999	176	25.7
1941/2	346	0.58			

Sources: Releases in 1930s: Finler, *Hollywood story*, p. 288. Average production costs, 1930s: Eddie Mannix (MGM), C. J. Trevlin (RKO), and William Schaefer (Warner Bros.) ledgers (see n. 13). Releases and average production costs, 1990s: AC Nielsen/EDI dataset.

relatively limited form. As already indicated, the AC Nielsen/EDI dataset presents estimated costs for about half of the films released during the 1990s, allowing for the estimation of annual average production costs over the period. Cost data are also available for three major producers in the 1930s and early 1940s—Warner Bros., MGM, and RKO—thereby generating the average cost of the films produced by these studios. Table 1 presents these average (real) cost data, annually, for both the 1930s and the 1990s, together with the total number of films released by the majors in both decades.[21] It can be seen that average film production costs more than doubled between 1988 and 1999, in real terms, although the number of films released by the majors increased only marginally, in contrast to the total number of releases, which increased from 318 films in 1988 to 444 films in 1999. However, the majors still dominated box-office revenues, consistently accounting for over 90 per cent of revenues annually, even though their films accounted for a declining proportion of total releases, from 52 per cent in 1988 to 40 per cent in 1999. A similar picture is revealed by the 1930s data, with average real production costs more or less doubling between 1929/30 and 1941/2, but with the number of film releases being broadly stable. In relative terms, the average real cost of films produced by the majors was of the order of six to seven times higher in the 1990s than in the 1930s.

However, the main difference between the 1930s and the 1990s is that modes of film consumption have changed radically, particularly from the 1980s, to the point where box-office revenues are now a relatively minor source of total film revenues, which explains the relatively modest increase in consumers' expenditure on film-going reflected in figure 5. Vogel presents data that imply that theatrical box-office

[21] For the 1930s, the number of releases by the major studios is derived from Finler, *Hollywood story*, p. 280. For the 1990s, the number of releases by the major studios is derived from the AC Nielsen/EDI dataset. See above, n. 17, for the definition of a 'major' distributor during the 1990s. The number of releases shown in tab. 1 includes the releases of Miramax and Dreamworks, but these studios are excluded for the purposes of deriving estimated film production costs.

revenues accounted for nearly 53 per cent of total film revenues in 1980, but had declined to just 29 per cent in 2000 (US box-office revenues having declined from 30 to 15 per cent and foreign box-office revenues from 23 per cent to 14 per cent), the remaining revenues being accounted for by video and television.[22] That is, in terms of figure 5, while consumers' expenditure on film-going has increased since 1980, it accounts for a declining proportion of gross film revenues, with the exploitation of other modes of exhibition becoming increasingly important.

III

The initial commercial exploitation of 'moving image' technology was very much experimental, as producers sought ways to entertain audiences. In the early part of the twentieth century, cinema programmes were made up of a succession of short films of varying genres, often as part of a wider musical hall/vaudeville programme. Gradually, responding to customers' reactions, exhibitors began to single out certain films in their publicity, almost always 'story' films with distinctive (but initially anonymous) players, as the 'featured' item—the main attraction—in a programme. From the mid-1910s, however, feature films of increasing length, with expensive star 'names' heading the cast, began to establish themselves as the industry standard, with a resultant escalation in production costs, but also with the potential to generate astonishing profits.[23] An outstanding example was *Lights of New York* (1928) (considered to be the first all 'talkie'), a film that cost just $23,000 to produce, but generated distributor rental income in the US of $1,160,000 on its initial release.[24] While success on this scale was unique, it did starkly emphasize the rewards available to 'hit' production, and this search for the 'hit formula' continues to dominate the process of film production to this day, a phenomenon that has been a key factor in understanding the strategies of Hollywood's studios, particularly in the post-Second World War period.

The evolution of the film industry reached its zenith in the 1930s and 1940s, with the technological refinements of sound and then colour and the consolidation of the 'star system', and film-going, in effect, became a staple consumption activity rather than a luxury one. This is apparent from figure 5. Indeed it is difficult to underestimate the hold that the cinema had over the public imagination during this period.

However, this very deep diffusion also developed a consuming public that became increasingly discriminating, with the added requirement that new films should embody some elements of novelty, demanding continual innovation on the part of producers. The problem was that consumers could not articulate the nature of innovations that they were seeking—they sought 'surprises', and 'would know it when they saw it', but in effect they had to be entirely producer-led. While the success of a film such as *Lights of New York* illustrated the staggering profits that could be generated from a very modest investment, this example was misleading, and was the exception rather than the rule. High box-office revenues tended to be generated by high-budget films, as film producers sought to surprise and innovate

[22] See Vogel, *Entertainment industry economics*, p. 62.
[23] See Bakker, 'Decline and fall'; idem, 'Stars and stories'.
[24] See Glancy, 'Warner Bros. film grosses'.

with films manifesting ever-increasing production values. However, there was certainly no direct or reliable link between the magnitude of production budgets and financial success. For example, films such as *Gone with the Wind* (1939) (produced at a cost of $4.8 million in 1929 prices), *Marie Antoinette* (1938) ($3.6 million), *The Wizard of Oz* (1939) ($3.4 million), *The Good Earth* (1937) ($3.4 million), *Northwest Passage* (1940) ($3.3 million), and *Conquest* (1937) ($3.3 million) all made substantial losses at their initial release, although all were critically acclaimed, top-ranking films, with some going on to generate substantial returns upon re-release. The largest profit-generators of the period were films of relatively modest budgets, while still tending to fall into the high-budget category. Among such films, the generator of the largest profit was *Mrs Miniver* (1942) (produced at a cost of $1.4 million, but yielding $5.1 million in profits). Other notable films were *Snow White and the Seven Dwarfs* (1937) (cost: $1.8 million; profits: $4.5 million) *The Singing Fool* (1928) ($0.4 million; $3.6 million), *Sergeant York* (1941) ($2.1 million; $2.7 million), *San Francisco* (1936) ($1.6 million; $2.8 million), *Boys Town* (1938) ($1 million; $2.6 million), and *The Broadway Melody* (1929) ($0.4 million; $1.6 million).[25]

Identifying a 'winning formula' and exploiting that formula was certainly one strategy that was (and continues to be) employed by film producers, in order to achieve some second-guessing mitigation of the unpredictability of audience tastes. A notable example was Warner Bros.' development of the high-budget musical in the early-to-mid-1930s, built around the success of films such as *Gold Diggers of 1933* and *42nd Street*. So successful were these films—generating an aggregate rate of return of over 100 per cent in the 1932/3 season and nearly 50 per cent in the following season—that by the mid-1930s Warner Bros. was committing almost 25 per cent of its total production budget to making musicals. The average production budget of these films was $0.7 million, with the most expensive film costing $1.4 million. However, the enthusiasm of the audiences soon waned, as they transferred their allegiance to a new style of musical made at RKO, featuring Fred Astaire and Ginger Rogers.[26] Although musicals accounted for 30 per cent of Warner Bros.' annual profits in 1932/3 and 42 per cent in the following season, this contribution fell to 16 per cent in 1934/5, declined further to 12 per cent in 1935/6, and thereafter musicals, in aggregate, made losses. Nonetheless, over the decade, the $23.9 million in production budgets that was invested in musicals generated aggregate profits of $7.2 million, accounting for 10 per cent of Warner Bros.' total profit over the period.

The outstanding example of a successful 'formula' during this period was MGM's series of Andy Hardy films. Ten of these films were produced from 1937/8 to 1941/2, at an average cost of just $0.4 million, with the most expensive costing $0.5 million. In aggregate the films generated profits of $14.1 million, from a total production budget of just $3.7 million, resulting in an aggregate rate of return of 122 per cent (taking account of distribution costs).

At the other extreme were the six Marx Brothers films produced between 1935/6 and 1940/1, five of which were produced by MGM and the other by RKO. These

[25] See Glancy, 'MGM film grosses'; idem, 'Warner Bros. film grosses'; Jewell, 'RKO film grosses'.

[26] See Sedgwick, *Popular filmgoing*, pp. 172–4, for a detailed discussion of the performance of the Astaire–Rogers films.

were all high-budget films, produced at an average cost of $1.5 million, but generating aggregate losses of $1.7 million. Only two of the films yielded very modest profits. Although these films all received critical acclaim, their appeal was relatively limited, and certainly so in relation to their costs of production.

In order to derive a more comprehensive overview of film financial performance during the 1930s, it is useful to disaggregate film production into various budgetary categories, and, in particular, to draw a distinction between high-budget, medium-budget, and low-budget production. Given the increase in average production budgets over the decade, as evidenced in table 1, it would seem appropriate to define budgetary categories in relative rather than absolute terms. The approach taken here is to define a film's budgetary category relative to the average cost of all films produced by MGM, RKO, and Warner Bros. in the film's year of release. Thus we define, somewhat arbitrarily, a high-budget film as one that exceeded the average cost of all films produced in its year of release by 50 per cent or more, and a low-budget film as one costing less than 75 per cent of average annual production costs. The remaining films are then defined as medium-budget. Table 2 presents a summary of annual budgetary allocations and financial performance in the North American market for MGM, RKO, and Warner Bros.

In terms of aggregate performance (last column), the overall rate of return from film production in the 1930s was 13.7 per cent. However, this was achieved within the context of considerable annual variability, even discounting the impact of the depression in the early years of the data period. A telling measure of the variability is the standard deviation of the annual rates of return, which was 7.9, or, in coefficient of variation terms, 58 per cent. In terms of budgetary allocations (penultimate row), in aggregate, just under 46 per cent of production budgets were allocated to high-budget production, with just under a third allocated to medium-budget production and the remainder to low-budget production (in terms of the number of films, about 20 per cent were high-budget, 30 per cent medium-budget, and 50 per cent low-budget). The general trend over the period was an increasing proportion of budgets being allocated to high-budget films, at the expense of medium-budget production, with broad stability in low-budget production. However, high-budget production generated a relatively low aggregate rate of return of 10.7 per cent, with marked annual variability reflected in the standard deviation of 11.7 (coefficient of variation: 109 per cent). Apart from the last two years of the data period, in which average production budgets were cut back (see table 1), the percentage contribution of high-budget production to aggregate profits was considerably less than the proportion of costs that it absorbed, and in a number of years high-budget production was the source of considerable losses. By contrast, low-budget production generated over a third of total profits while absorbing just over a fifth of costs, resulting in an aggregate rate of return that was almost twice that of high-budget production, within the context of a relatively stable annual rate of return performance. The contribution of medium-budget production to aggregate profits matched the proportion of costs that it absorbed.

Thus the overall picture that emerges from the 1930s is of increasing investment in high-budget production, but with little evidence of significant returns deriving from it. Lower-budget production effectively cross-subsidized high-budget production, and only in the last two years of the data period was there any evidence that a high-budget investment strategy might become a reliable source of positive returns.

Table 2. *Annual allocation to film budget categories and budget category financial performance, MGM, RKO, and Warner Bros., 1929/30 to 1941/2*

	High-budget films			*Medium-budget films*			*Low-budget films*			*All films*
Year	*% of costs*	*% of US profits*	*US rate of return (%)*	*% of costs*	*% of US profits*	*US rate of return (%)*	*% of costs*	*% of US profits*	*US rate of return (%)*	*Overall rate of return (%)*
1929/30	36.0	12.2	6.0	38.1	48.0	20.2	25.9	39.9	22.5	16.2
1930/1	27.9	–1,537.7	–11.4	50.1	250.0	0.8	22.0	1,387.8	9.3	0.2
1931/2	25.5	–25.4	–1.2	55.6	–77.1	–1.4	18.9	202.5	9.9	1.1
1932/3	40.4	32.8	17.5	39.8	32.2	15.2	19.8	35.0	27.5	19.0
1933/4	35.8	15.4	8.6	37.9	42.2	17.2	26.3	42.3	22.6	16.3
1934/5	44.5	35.1	17.7	29.7	29.9	19.7	25.8	35.1	24.4	20.3
1935/6	47.0	41.7	22.5	26.9	32.4	27.7	26.2	25.9	21.6	23.7
1936/7	53.8	23.5	4.9	25.8	25.6	10.0	20.4	50.9	22.3	10.4
1937/8	56.4	–4.2	–0.6	25.2	28.2	8.1	18.4	76.0	25.4	7.6
1938/9	50.8	20.3	6.4	28.4	37.5	17.4	20.8	42.2	25.2	14.3
1939/40	52.9	5.1	0.7	27.9	54.4	12.2	19.2	40.6	12.5	6.7
1940/1	54.7	56.0	23.0	24.9	23.0	19.2	20.5	21.0	21.0	21.6
1941/2	50.6	63.7	32.6	28.3	23.7	20.1	21.2	12.6	14.6	25.0
Aggregate	45.7	32.1	10.7	32.6	32.2	12.9	21.6	35.7	20.0	13.7
S.D.	9.9	416.5	11.7	9.6	67.4	7.9	2.9	358.9	5.9	7.9

Source: As for fig. 3.

The postwar period was characterized by a rapid decline in film-going—real expenditure on this activity fell by almost two-thirds between 1946 and 1965 (see figure 5). There were a number of reasons for this decline. Increasing real incomes and reductions in working hours opened up a range of alternative recreation activities. The rapid increase in urbanization and home ownership resulted in radical lifestyle changes, and, together with the explosion in the birth rate, what had been the core film-going public up to that point was now otherwise engaged.[27] The rapid diffusion of television—from less than 9 per cent of American households possessing a television in 1950 to 64 per cent just five years later—also had a drastic impact on film-going.[28] Indeed, it has been argued that the diffusion of television accounted for more than 70 per cent of the drop in motion picture revenues in 1950 and 1951, falling to 60 per cent in 1952, 58 per cent in 1953, and 55.8 per cent in 1954.[29] The era in which a major studio, such as MGM, needed to produce a new film on average every nine days to service the exhibition market was over.

The response of film producers to these changes was to cut back on quantity and to focus much more intensively on the production of a relatively small number of hits—films that could be considered likely to appeal to a wide audience and hence generate large revenues. Comprehensive data on film performance in the immediate postwar period are much less readily available compared to the prewar period and the 1980s and 1990s, but the trade magazine *Variety* published, in January of each year, estimates of the distributor rental incomes earned by each of the top ranking films in the preceding year (rental incomes are generally assumed to be up to about half of total box-office revenue).[30] Figure 6 shows the estimated real rental incomes of the top 10 of these films, annually, from 1946 to 1965, together with consumers' real expenditure on films. It is evident that within the context of an overall decline in consumers' expenditure on film-going, the rental incomes of the top 10 films, while declining in the 1940s, recovered and grew in the 1950s and 1960s, though in a somewhat volatile manner. This is in contrast to the more ordered environment of the 1930s, where increasing consumer expenditure was matched by increases in total domestic revenues and the revenues of the top 10 films distributed by MGM, RKO, and Warner Bros. The decline in the revenues of middle-budget films led to the collapse of the studio system and the reconception of the studios as distributor/financiers and occasional producers. These changes in the focus of the studios were further reinforced by the Supreme Court's Paramount Divorcement Decree of 1948.[31]

The 1990s once again saw Hollywood as a confident and dominant force in film production. The recovery of the industry from its postwar decline had been a slow one, but, starting with the development of multi-screen cinemas in the 1960s in

[27] See Gomery, *Shared pleasures*, pp. 82–8; Sedgwick, 'Differentiation', pp. 678–82.

[28] United States Department of Commerce, Bureau of the Census, *Historical statistics*, tab. H874, p. 400.

[29] Ibid., p. 14.

[30] *Variety*, 8 Jan. 1947, p. 8; 7 Jan. 1948, p. 63; 5 Jan. 1949, p. 46; 4 Jan. 1950, p. 89; 3 Jan. 1951, p. 58; 2 Jan. 1952, p. 70; 7 Jan. 1953, p. 61; 13 Jan. 1954, p. 10; 5 Jan. 1955, p. 50; 25 Jan. 1956, pp. 1, 15; 2 Jan. 1957, pp. 1, 4; 8 Jan. 1958, pp. 9, 48; 7 Jan. 1959, p. 48; 6 Jan. 1960, p. 5; 4 Jan. 1961, p. 47; 10 Jan. 1962, p. 13; 9 Jan. 1963, p. 13; 8 Jan. 1964, p. 7; 6 Jan. 1965, p. 39.

[31] See De Vany and Eckert, 'Motion picture antitrust'; Maltby, *Hollywood cinema*, pp. 161–5. Prior to divestiture, the five 'majors'—Paramount, Twentieth Century Fox, MGM, RKO, and Warner Bros.—owned 70% of first-run film theatres.

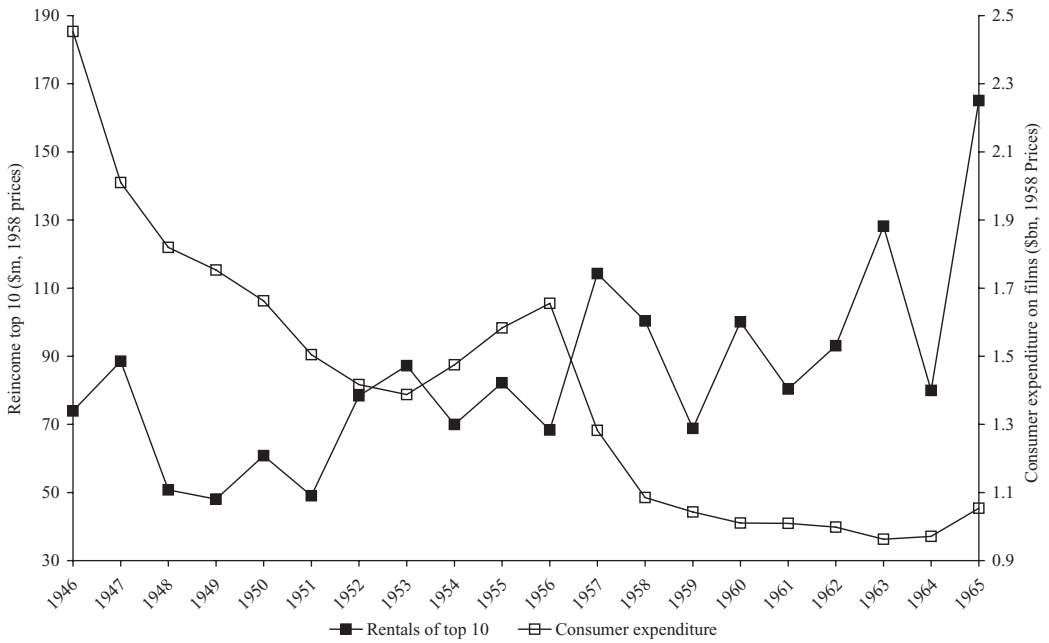

Figure 6. *Rental incomes of top 10 films and consumers' expenditure on films, 1946–65*
Source: Variety, 1946–65 (see n. 30); Vogel, *Entertainment industry economics*, tab. S1.1, p. 38.

newly suburbanized areas, followed by the emergence of a variety of media innovations (cable, satellite, video, and computers on the exhibition side in the 1970s and the 1980s, and on the manufacturing side, the development of technologies that permitted the production of films of ever-greater technical sophistication), Hollywood has once again developed a hold on the public imagination that is out of all proportion to its relatively modest size as an industry.

In terms of both cinema admissions and box-office revenues, the industry in the US has shown impressive growth (a 36 per cent increase in admissions and a 47 per cent increase in real box-office revenues between 1988 and 1999).[32] However, box-office revenues now account for a relatively minor component of all film revenues—as reported above, Vogel estimates that US box-office revenues accounted for only 15 per cent of all film revenues in 2000, down from 30 per cent in 1980, with home video now accounting for 38 per cent of revenues, up from just 7 per cent in 1980.[33] This means that the growth in box-office revenues and cinema admissions understates the growth of the industry. However, while box-office revenues now account for a relatively small proportion of aggregate film earnings, initial box-office performance is a crucial determinant of earnings in ancillary markets and is thus highly correlated with them.[34]

In order to compare and contrast the financial performance of films in the 1990s with that in the 1930s, table 3 presents the film budget category analysis for the

[32] See Vogel, *Entertainment industry economics*, tab. 2.4, pp. 52–5, for admissions data, and the AC Nielsen/EDI dataset for real box-office data.
[33] See Vogel, *Entertainment industry economics*, tab. 2.8, p. 62.
[34] See Weinberg, 'Profits out of the picture', pp. 172–6.

Table 3. *Annual allocation to film budget categories and budget category financial performance, majors, 1988 to 1999*

	High-budget films			*Medium-budget films*			*Low-budget films*			*All films*
Year	*% of costs*	*% of US profits*	*US rate of return (%)*	*% of costs*	*% of US profits*	*US rate of return (%)*	*% of costs*	*% of US profits*	*US rate of return (%)*	*Overall rate of return (%)*
1988	49.7	50.3	35.1	36.3	37.6	34.8	14.0	12.1	30.2	34.3
1989	63.2	81.2	43.1	27.4	14.9	21.9	9.4	4.0	17.3	35.8
1990	46.8	40.6	26.3	39.3	42.5	31.5	13.9	16.8	33.9	29.4
1991	47.3	50.1	33.6	38.3	40.7	33.2	14.4	9.2	21.9	31.9
1992	54.1	49.6	31.9	31.8	31.0	33.1	14.1	19.4	42.5	33.9
1993	46.9	68.4	50.8	40.6	18.9	21.4	12.5	12.7	39.8	39.3
1994	53.6	54.5	29.0	37.9	26.8	20.7	8.5	18.7	48.3	28.1
1995	59.4	32.3	21.5	27.0	47.6	47.9	13.7	20.1	37.9	33.0
1996	67.5	92.8	22.3	20.5	−7.3	−5.8	12.0	14.5	18.0	16.0
1997	64.4	90.5	31.5	22.3	3.1	2.9	13.3	6.4	10.0	21.7
1998	67.9	57.1	10.1	17.7	33.1	17.4	14.3	9.8	7.1	11.2
1999	61.5	53.2	23.6	23.1	28.6	29.4	15.3	18.2	28.7	25.9
Aggregate	57.8	58.3	28.6	29.1	27.9	25.7	13.1	13.8	27.3	27.6
S.D.	7.8	18.4	10.2	7.8	15.8	14.0	2.0	5.1	12.6	8.0

Source: As for fig. 4.

1990s corresponding to that presented in table 2 for the 1930s. In terms of overall rate of return performance, the 27.6 per cent achieved in the 1990s is double that of the 1930s, although there is some evidence of declining performance over the period covered by the data. In terms of the relative performance of the three budget categories, the striking differences between the two data periods are: (a) the superior and more stable performance of high-budget production in the 1990s; (b) the higher proportion of budget allocations that went to high-budget production in the 1990s compared to the 1930s (in terms of percentage of films, about 31 per cent were high-budget in the 1990s, 35 per cent medium-budget, and 34 per cent low-budget); and (c) the limited contribution made by low-budget production to profitability performance in the 1990s. Indeed, measured by annual rate of return variability, high-budget production in the 1990s is the most stable of the three categories (in terms of both standard deviation and coefficient variation of the annual rates of return), the reverse of the situation in the 1930s.

Thus, while Hollywood has experienced considerable volatility in its financial performance since the 1920s, the corporate power base of the industry has remained remarkably stable. Studios such as Warner Bros., Paramount, Twentieth Century Fox, and MGM were major players in the 1930s and continue to be so today. Certainly the structure and ownership of these companies have changed, but the industry is still one that is dominated by a small number of large producers/distributors. During the 1930s, the five major players (MGM, Paramount, RKO, Twentieth Century Fox, and Warner Bros.) accounted for up to 50 per cent of films released onto the US market, annually, but obtained a considerably higher share of annual box-office revenues, because they dominated the market for higher-budget (hence high revenue generating) films. A similar but even more marked pattern of domination characterized the 1990s. In the latter part of the decade, the dominant distributors were Buena Vista, Dreamworks, Miramax, MGM, New Line, Paramount, Sony, Twentieth Century Fox, Universal, and Warner Bros. These producers accounted for a declining share of the films distributed within the US market—from about 60 per cent at the beginning of the decade to about 40 per cent at the end—but consistently accounted for over 90 per cent of US box-office revenues throughout the decade, as high-budget films became ever more dominant.

IV

One source of the volatility in the returns to film production presumably derives from the inability of film producers consistently and accurately to predict audience tastes and hence to determine the precise characteristics of a 'hit' film—essentially because audiences themselves are incapable of articulating or even recognizing what it is that they seek in the 'movie experience'. It is also an industry in which innovation is an imprecise amalgam of creativity and technology. Furthermore, film production is an industry that offers the possibility of spectacular profits from just a single unit of often modestly costed output, and hence attracts a wide range of producers, from small independents to large conglomerates.

One manifestation of the risk and competitiveness of filmmaking is the extent to which the market shares of studios/distributors are subject to wide fluctuations from year to year. A simple, if somewhat extreme, illustration is that of Paramount

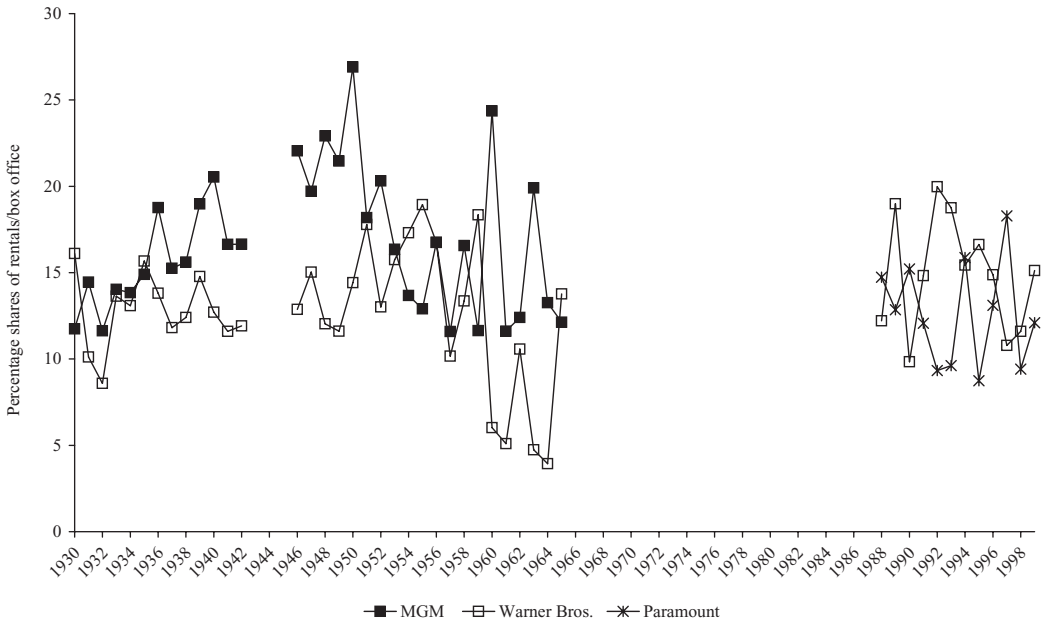

Figure 7. *Market shares of MGM, Warner Bros., and Paramount, 1930–99*
Source: As for figs. 1, 2, and 6.

and the film *Titanic*, released in 1997.[35] In 1997, Paramount achieved a market share of 18.3 per cent (of total US box-office receipts). If *Titanic* had not been produced, Paramount's market share would have been just 9.9 per cent. Figure 7 shows the annual market shares (of North American distributor rentals) of three studios/distributors—MGM, Warner Bros., and Paramount—for the three data periods 1930–42, 1946–65, and 1988–99.[36] The marked annual variability of these market shares, and the rapid changes in market position are clear, and are characteristics reflected in the market shares of all studios/distributors. They show that although it is often argued that the oligopolistic market structure of Hollywood presents an almost insurmountable barrier to entry, the environment is nonetheless a highly competitive one.[37]

Tables 2 and 3 above have already presented a comparison of the financial performance of the majors between the 1930s and 1990s. The clear superiority of financial performance in the 1990s is evident, and particularly so with respect to the returns to high-budget film production. However, both data periods exhibit

[35] Paramount was not in fact entirely responsible for the financing of *Titanic*—it only took a part interest in financing the film, after Fox sold a stake in the film to Paramount, feeling that it needed to divest itself of some of the risk as the production budget began to run out of control. But Paramount is credited as the distributor of the film.

[36] The three sets of market shares are not directly comparable. For the 1930 to 1942 period, the shares are shares of estimated total US rentals accruing to distributors. Estimated US rentals are derived as one-third of annual total box-office revenues over the period. For the 1946 to 1965 period, the shares are shares of distributor US rentals of the annual top grossing films. For the 1988 to 1999 period, the shares are the shares of annual US box-office revenues.

[37] See De Vany and Lee, 'Stochastic market structure', pp. 194–200.

considerable annual variability in aggregate rate of return performance, with a secular decline in rates of return in the 1990s, such that the rates of return achieved at the end of the 1990s broadly matched those achieved in the successful years in the 1930s.

Table 4 presents a comparative analysis of high-budget film production in the 1930s and the 1990s. Three definitions of high-budget production are used—(a) films costing more than 1.5 times the average annual production budget (the definition used up to this point); (b) films costing more than twice the average annual production budget; and (c) films costing more than three times the average annual production budget. It is clear from table 4 that, as might be expected, high-budget production was much more extensive in the 1990s compared to the 1930s, in terms of the percentage of films falling into the three high budgetary categories, and the percentage of total production costs absorbed by each of the categories. However, the main feature of table 4 is that the aggregate rate of return of high-budget production increases with budgetary category in the 1990s, whereas it declines sharply in the 1930s. Perhaps the most significant difference between the two data periods relates to the performance of the very high-budget films—films costing three times average annual production costs. In both time periods, these films absorbed about 14 per cent of total production budgets, but in the 1930s these films generated just 3.6 per cent of total profits, whereas in the 1990s these films generated almost a fifth of all film profits.

The superior performance of high-budget films in the 1990s derives from a broadly positive relationship between film rates of return and relative production budgets, in contrast to a broadly negative relationship during the 1930s. This can be illustrated via simple regression equations, regressing film rates of return on film relative average costs—the ratio of a film's production budget to the average cost of all films produced in the film's year of production (*RAVCOST*), and hence directly reflects the budgetary category into which any given film falls. These regressions produce a negative and statistically significant coefficient on *RAVCOST* for the 1930s and a positive and statistically significant coefficient for

Table 4. *Comparative performance of high budget production, majors, 1930s and 1990s*

	1929/30 to 1941/2				*1988 to 1999*			
High-budget category	*Rate of return (%)*	*% of films*	*% of costs absorbed*	*% of profits generated*	*Rate of return (%)*	*% of films*	*% of costs absorbed*	*% of profits generated*
1.5 times average production costs	8.8	18.9	45.7	32.1	25.5	31.1	57.8	58.3
Remaining films	15.3				23.1			
2 times average production costs	6.8	10.0	30.3	16.7	29.5	16.9	39.2	44.8
Remaining films	14.7				21.4			
3 times average production costs	2.9	3.3	14.0	3.6	36.6	4.4	13.7	19.1
Remaining films	13.8				22.6			

Source: As for tabs. 2 and 3.

the 1990s.[38] These equations are not to be interpreted as 'models' of rate of return performance—they simply reflect in a very generalized sense the broad relationship between rate of return performance and budgetary category. The equations produce very low R^2 values, both periods being characterized by marked variation in film rates of return, the explanation of which presents a substantial challenge—indeed the 'nobody knows' principle would suggest that it defies explanation, certainly in an *ex ante* sense. Rather, the negative relationship in the 1930s derives from the superior profitability of lower- and medium-budget production. By contrast, in the 1990s, high-budget production represented the focus for film-making activity, and hence was the major source of profitability.

As noted above, the focus on hit films as a primary source of industry profits began in the immediate postwar period in response to the range of demographic changes that took place during that time and the rapid diffusion of television, which suggests that the conclusions drawn above about the nature of film production in the 1990s are best interpreted as the continuation of a process that was set in motion in the 1950s. The studio system of the 1930s was ideally suited to generating a mixed portfolio of films, but where financial success derived from tightly budgeted films with wide audience appeal and modest artistic aspirations. High-budget films in the 1930s are perhaps best interpreted as having been experimental in nature, a focus for developing the art form, even to the point of having elements of what today might be interpreted as vanity projects.[39] However, these high-budget films were ultimately heavily cross-subsidized by lower-budget production.[40] The relative lack of success of high-budget production in the 1930s might also be explained by there being relatively limited opportunities for revenue generation to cover amortization, because of the short theatrical release life of a film. In addition, the expansion in production budgets over the period was presumably also encouraged by the exhibition arms of the majors, given that their objective was to exhibit films that attracted large audiences and therefore yielded large revenues. Writing in 1944, Huettig argued that it was the exhibition arms that controlled the 'purse strings'; two-thirds of the total capital of the majors was invested in theatres during the 1930s, and thus a film that may not have been profitable for producers might still have generated sufficient demand from exhibitors to make exhibition worthwhile.[41]

In the postwar period, however, high profile/high budget production began to be seen as a necessity rather than a luxury, upon which the continued success of the industry depended. Consumers, with a rapidly growing range of choices for

[38] For the 1930s, the following estimated regression equation is produced (White standard errors in brackets):

$$RoR_i = 18.692 - 0.058 RAVCOST_i \qquad R^2 = 0.025$$
$$(1.012)\ (0.008) \qquad n = 1796$$

The regression results for the 1990s are:

$$RoR_i = -11.505 + 0.099 RAVCOST_i \qquad R^2 = 0.024$$
$$(2.734)\ (0.008) \qquad n = 1458$$

[39] Examples are the Warner Bros. production *A Midsummer Night's Dream* (1935) and MGM's *Romeo and Juliet* (1936).

[40] See Sedgwick and Pokorny, 'Risk environment'.

[41] See Huettig, 'Economic control', p. 291.

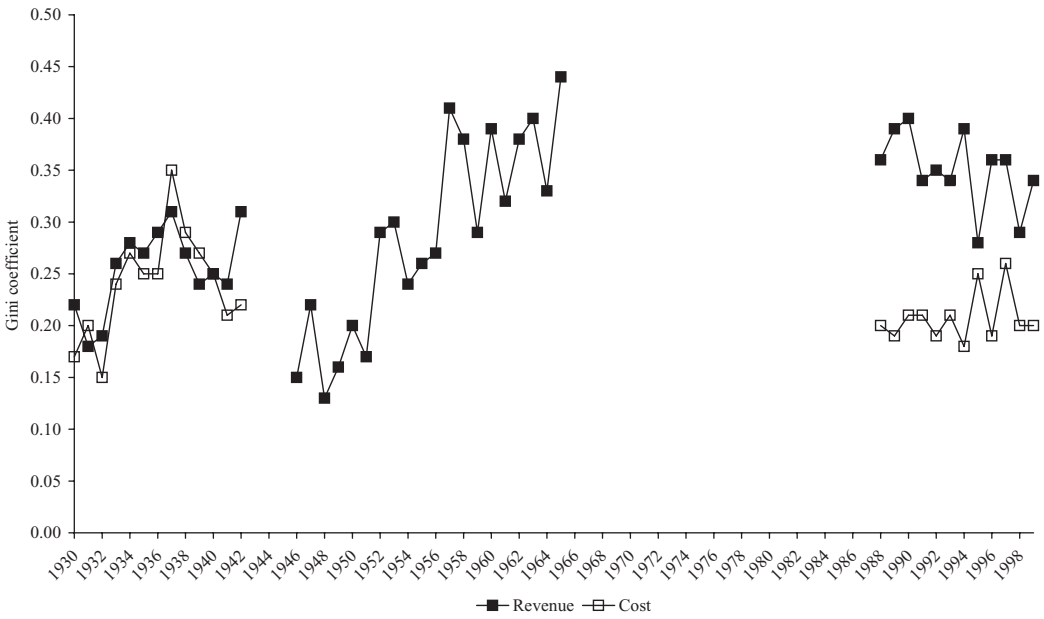

Figure 8. *Annual Gini coefficients, top 60 revenue generating films and top 60 highest budget films, 1930 to 1942, 1946 to 1965, and 1988 to 1999*
Source: As for fig. 7.

recreational expenditure, needed to be attracted back to film-going, and this could only be achieved by the product differentiating itself from the standardized form of entertainment then being offered by television, a form of entertainment which could be interpreted as being a very close substitute for that provided by lower-to-medium-budget film production in the prewar period.

The manifestation of such a development would be reflected in the characteristics of the size distribution of the top revenue generating films in each year. That is, an increasing emphasis on hit production would be reflected in an increasingly unequal revenue distribution among the top ranking films. One method of measuring this inequality is via a Gini coefficient, applied to the revenues generated by the top n films of each year. We will here consider the top 60 revenue-generating films in each year of the three data periods.[42] The coefficient will approach 1 if the revenue distribution is dominated by a single film, with minimal contributions from the remaining 59 films, and it will be 0 if all 60 films generate identical revenues.

Figure 8 presents these annual Gini coefficients for the revenues of the top 60 films for each year of the three data periods. Gini coefficients are also presented for the cost distributions—that is, for the top 60 highest budget films each year, for 1930 to 1942 and 1988 to 1999. These Gini coefficients broadly reflect what was

[42] The formula used here for the Gini coefficient is $G = \sum_{i=1}^{60}(2i - n - 1)x_i \Big/ n\sum_{i=1}^{n} x_i$, where x_i is the revenue generated by film i, these revenues having been ordered from smallest to largest, and i is the rank of x_i, taking on the value 1 for the smallest value and n for the largest value. We use the top 60 films, as this represents the minimum number of films for which revenue data are available during the sample period (in 1946).

expected. In terms of revenue distributions, the values of these coefficients were relatively low during the 1930s, although they increased during the decade as an increasing number of 'mega hits' began to emerge. However, it was in the immediate postwar period that the upward trend in the revenue coefficients was most marked. The coefficients in the late 1940s and early 1950s were relatively low and comparable to those in the early 1930s—in both cases reflecting low demand and hence 'flat' revenue distributions. But from the 1950s onwards there was strong secular growth as film producers became increasingly successful in producing a small number of high revenue generating films, which provided the focus for the recovery of the industry. In terms of the 1990s, the coefficients can be interpreted within the context of a consolidation of the process that was completed by the mid-1960s—the coefficients during the 1990s are relatively stable, and comparable to the levels achieved during the 1960s.

The coefficients relating to the cost distributions offer further insights into this process. During the 1930s the inequality of the revenue distributions closely followed the inequality of the cost distributions—the mechanism that generated increasingly concentrated revenue distributions was increasingly concentrated cost distributions (although this did not in general result in increased profits). By contrast, the concentration of the cost distributions was remarkably stable during the 1990s, albeit at a higher level—in only two of the 12 years was there a noteworthy divergence from this stability, 1995 and 1997, which in turn resulted in the main from just two over-budget films, *Waterworld* in 1995, and *Titanic* in 1997. But the main differences between the 1930s and the 1990s are that in the 1990s the concentration of the cost distributions was significantly lower than the corresponding revenue distributions, and that the cost coefficients were considerably less volatile than the revenue coefficients. The implication is that production budgets in the 1990s, although much higher in real terms than in the 1930s, were much more tightly controlled, and that the revenue distributions that they generated consistently produced hit films, in a profit generating sense.

V

This article provides an overview of the evolution of the market for films in the US since the onset of the talkies. One notable aspect of this evolution is how stable the structure and broad characteristics of the market have remained, notwithstanding considerable changes in demand conditions. The industry has demonstrated itself to be remarkably robust in the face of these changes, learning how to spread risk across annual portfolios of films, while recognizing the importance of investing heavily in particular film properties in the hope of capturing the huge revenues generated by the 'hits' of the season.

In the process of comparing the performance of films across these decades, it has been necessary to adopt a standard approach to production costs, distribution costs, and revenues, and to work the datasets drawn from the different eras in a consistent fashion. Our methods thus reflect differences in the manner in which revenues were generated across the period: before 1960 almost all revenue was derived from theatrical release, but by 2000 this had fallen to just 30 per cent. They also reflect the fact that approximately half of theatrical revenues were generated outside of the North American market. A further adjustment was necessary to account for the fact that the theatrical revenues found in the 1946–65 and 1990s

datasets needed to be adjusted to make them compatible with the rental earnings reported in our 1930s dataset. A final adjustment involved estimating distribution costs by making these a function of production costs and revenues for all films in the 1990 dataset, and the Warner Bros. studio in the 1930s.

In making these adjustments, it has been possible to derive estimates of film profitability during the 1990s which, in contrast to previous estimates in the literature which have been derived on the basis of the crude difference between film revenues and production costs,[43] better reflect the reality of the film business environment. Furthermore, these adjustments make possible a direct comparison between the profitability of film production in the 1930s with that in the 1990s. In doing this, we found increasing returns to production costs in the 1990s, a result that contrasted with the 1930s, and was central to Hollywood's recovery and growth in the postwar period.

Although the returns from an individual film project are essentially unpredictable, investment in film production can still be interpreted as a rational activity, within the context of an appropriately diversified investment portfolio. The fundamental difference between the Hollywood of the 1930s and contemporary Hollywood is that studios are no longer the sole locus of this diversification process, and now operate alongside the individual/institutional investor to achieve an appropriate, and presumably more efficient, level of diversification within the context of their own investment strategies.

Film studios today are also now parts of larger vertically integrated entertainment–leisure–media conglomerates. This provides a further mechanism for controlling the risks involved in film production, with the outputs of the studios being inputs into the other divisions of these conglomerates, allowing the synergies between the various elements of film production, distribution, and exhibition to be fully exploited. In some respects this market structure echoes that of the industry in the 1930s, when the major studios were also vertically integrated, with their own exhibition arms, and tight contractual control over stars via the studio system. When the studio system collapsed in the postwar period and the majors were forced to divest themselves of their exhibition subsidiaries, they averted what might have become a terminal decline by challenging television (wide-screen spectacle and stereophonic sound), and also adjusting to it (licensing their old product for transmission and producing dedicated 'made for TV' films). They were then helped immeasurably by the emergence (ironically, not immediately welcomed) of the new technologies of film consumption, so that Hollywood has now adapted into a new structure based upon maximizing exposure and exploiting the synergies with other media, particularly video and television.

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[43] See, for example, De Vany and Walls, 'Motion picture profit'.

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APPENDIX: THE ESTIMATION OF FILM PROFITABILITY

Estimating profitability for Warner Bros. films in the 1930s

The approach taken here is to establish a relationship between the profitability of the MGM and RKO films and the production costs and distributor rentals that these films generated. The rate of return—*RoR*—that a given film generates can be expressed as:

$$RoR = \frac{R-(C+D)}{C+D} \tag{A1}$$

where R denotes the total rental income generated by the film, both domestic and foreign, C denotes the production costs of the film, and D its distribution costs. The problem with the Warner Bros. dataset is that D is unknown. Equation (A1) can be re-expressed as:

$$(RoR+1)^{-1} = \frac{C+D}{R} \tag{A2}$$

Now, the distribution costs of a film were presumably directly related to the revenues generated by the film—the broader was the reach of the film, the higher were the distribution costs. It was presumably also the case that initial promotional expenditures were determined as some (relatively small) proportion of production costs. Thus the distribution costs, D, of a film can be interpreted as having been directly related to production costs, C, and the revenues, R, generated by the film, or, in the simplest specification:

$$D = \alpha C + \beta R \tag{A3}$$

Substituting equation (A3) into equation (A2) and rearranging produces:

$$(RoR+1)^{-1} = (1+\alpha)\frac{C}{R} + \beta \tag{A4}$$

This is the basic form of the equation used to estimate the rates of return of the Warners films, given that both C and R are available for these films. Note that identical estimates of RoR would be produced if either current or constant prices were used for both C and R, given that in the case of the constant price series the relevant price index would simply cancel in the ratio of C to R. Note also that, by definition, the rates of return generated in foreign and domestic markets are identical, on the assumption that production costs are apportioned to each market proportionally to the revenues generated in each market—this same proportion would appear in both the numerator and denominator of C/R.

Therefore, in order to derive estimates of Warner Bros. film rates of return, we first require estimates of $1 + \alpha$ and β. These can be derived from the 1,077 MGM and RKO films in the dataset for which observations on RoR, C, and R are available. The resulting regression is shown as equation (1) in table A1. This regression produced insignificant heteroskedasticity and non-linearity test statistics (White's and Ramsey's RESET tests, respectively).[44] In this connection, note that a very high $\bar{R}^2$ of 0.969 is produced, with highly significant parameter estimates, and consequently the equation would appear to provide a robust basis for deriving estimated rates of return for the Warner Bros. films.

Before employing equation (1) there are two aspects of this estimation process that require further investigation. The first is the possibility that the parameter estimates might vary between the two studios, and the second is the extent to which the parameter estimates might vary over time. Equation (2) tests for differences between the studios, where MGM is a binary variable, taking on the value 1 for the MGM films (and 0 for the RKO films). Thus, given the insignificance of the parameter estimates on both MGM and

[44] Given the time-series dimension to the data set, autocorrelation might also be a potential problem. However, the data do not conform to the definition of panel data, being pooled cross-sections over time. In the case of such data, the normal convention is to assume that the samples at each time point are independent across time, and that autocorrelation within such a context is not an issue. See Wooldridge, *Econometric analysis*, pp. 128–35, for a more detailed discussion.

Table A1. *Least squares regressions for* $(RoR +)^{-1}$ *, MGM and RKO films, 1929/30 to 1941/2*

Independent variables	*Equation (1) coefficient (std error)*	*Equation (2) coefficient (std error)*	*Equation (3) coefficient (White's std error)*
CONSTANT	0.345*	0.345*	0.328*
	(0.004)	(0.006)	(0.004)
C/R	1.055*	1.050*	1.070*
	(0.006)	(0.008)	(0.006)
MGM		–0.003	
		(0.008)	
*C/R**MGM		0.016	
		(0.012)	
1932/33			0.051*
			(0.010)
*C/R*1932/33*			–0.043*
			(0.016)
n	1077	1077	1077
$\bar{R}^2$	0.969	0.970	0.971

Note: * Significant at the 1% level.
Source: As for fig. 3.

the interaction between *MGM* and C/R, the hypothesis of the stability of $1 + \alpha$ and β between the two studios is supported. In order to test the stability of the parameters over time, a range of potential breakpoints was tried. After a degree of experimentation, evidence emerged of a significant breakpoint occurring at 1932/3, and these results are shown in equation (3) in table A1, where *1932/3* is a binary variable taking on the value 1 for all films produced prior to and including the 1932/3 season (0 otherwise) (equation (3) exhibited evidence of heteroskedasticity, and hence White's heteroskedasticity-adjusted standard errors are used). The significance of the parameter estimates on *1932/3* and the interaction between *1932/3* and C/R confirms the existence of this breakpoint. Further tests were carried out between 1933/4 and 1941/2 to determine whether additional breakpoints occurred within this period, but no evidence was found to reject the hypothesis of stable parameter values over this period. Therefore equation (3) was used to estimate the rates of return of each of the Warner Bros. films. However, it should be emphasized that the use of equation (1) or equation (3) produced only minor differences in these rate of return estimates, the correlation coefficient between the estimates produced by equation (1) and equation (2) being 0.995.

Given the estimated rates of return generated by equation (3), the level of profits generated by the Warner Bros. films can be derived from equations (A1) and (A2). That is, from equation (A1) we can write:

$$Profit = R - (C + D) = RoR * (C + D) \tag{A5}$$

From equation (A2) we have:

$$C + D = \frac{R}{RoR + 1} \tag{A6}$$

and substitution into equation (A5) produces:

$$Profit = \frac{R * RoR}{RoR + 1} \tag{A7}$$

Substituting total rentals in 1929 prices for R in equation (A7) produces an estimate of total profits in 1929 prices generated by each of the Warner Bros. films, and substituting domestic rentals in 1929 prices for R produces an estimate of real profits generated in the North American market for each of the films.

Estimating profitability for films produced in the 1990s

The starting point in estimating film rates of return for the 1990s is equation (A4) above, which can be expressed explicitly in terms of RoR as follows:

$$RoR = \left[(1+\alpha)\frac{C}{R} + \beta \right]^{-1} - 1 \tag{A8}$$

However, in applying equation (A8) to estimate film rates of return for the 1990s, a number of approximations have to be made. First, the A. C. Nielsen/EDI revenue data are total US (and Canadian) box-office revenues, rather than distributor rental incomes. However, Vogel provides annual estimates of the proportion of total box-office revenues that reverts to distributors as rental income.[45] Applying these proportions to the box-office revenues of each of the films in the dataset produced estimates of the rental incomes generated by these films in North America (hereafter referred to as US). These estimates of rental income were then deflated by the Consumer Price Index (CPI), producing a series in 1987 prices. Denote these estimated real rental incomes as $\hat{R}_{US}$, and these rental incomes then become the appropriate value for R in equation (A8).

Next we require the appropriate value for C in equation (A8). There are two adjustments that are required here. First, as the rental incomes used in equation (A8) derive just from US distribution, the production cost data should be adjusted accordingly, and in particular, multiplied by the proportion of total revenues generated by each film in the US, thereby reflecting the proportion of production costs attributable to US distribution. However, data are not widely available for each film on revenues earned in both US and foreign markets (for the 2,116 films in the dataset for which cost data are available, foreign revenues are available for just 514 of these).[46] For the other 1,602 films it is assumed that foreign revenues accounted for 50 per cent of total revenues, given that in aggregate this was the case during the 1990s.[47] The second adjustment that needs to be made to the production cost data derives from the recognition that the major difference between the 1930s and the 1990s was the role played by ancillary markets in the latter period (home video, television). Vogel estimates that worldwide theatrical revenues accounted for about 52 per cent of total revenues in 1980, but had declined to about 30 per cent by 2000, with home video revenues increasing from 7 to 38 per cent.[48] Assuming that theatrical revenues accounted for an average of 40 per cent of total revenues during the 1990s, then this proportion can be applied to the production cost data. Therefore the final value of C used in equation (A8) was adjusted by both the proportion of production costs attributable to theatrical release and the proportion attributable to US distribution (with the resulting value of C then deflated by the CPI).[49]

[45] See Vogel, *Entertainment industry economics*, tab. 2.4, pp. 52–5.
[46] These were obtained from the website worldwideboxoffice.com.
[47] Vogel, *Entertainment industry economics*, tab. 2.4, pp. 52–5.
[48] Ibid., tab. 2.8, p. 62.
[49] Note that an assumption of theatrical revenues accounting for 40% of all revenues is a conservative one, in the sense that it is likely to understate the profits generated via theatrical release. That is, irrespective of whether theatrical revenues declined linearly or proportionately from 52% of all revenues in 1980 to 30% in 2000, 40% would be about the maximum during the 1990s, and hence attributing 40% of costs to theatrical release in Equation (7) would if anything underestimate theatrical rates of return.

As a starting point in estimating film rates of return during the 1990s, the parameter estimates produced by equation (3) in table A1 were used—that is, 1.07 for $1 + \alpha$ and 0.33 for β. The justification for the use of these estimates (rather than those in equations (1) or (2)) is that they derive from film performance during the more stable period in the 1930s, post-1932/3. The resulting rate of return estimates for the 1990s implies that 47 per cent of the 2,116 films in the dataset broke even or better. This percentage is somewhat higher than the 30 to 40 per cent that 'industry wisdom' would suggest,[50] but the measure does take explicit account of the revenues generated in ancillary markets, via just 40 per cent of production budgets being apportioned to theatrical release. However, it has been argued that a feature of the contemporary film industry is the increasing importance of marketing and distribution costs,[51] which would imply that the parameter estimates used in equation (A8) might underestimate these costs. Increasing the estimate of β used in equation (A8) to 0.4 resulted in 43 per cent of films breaking even or better. Further, Vogel has suggested that distribution costs were equivalent to about 45 per cent of production costs throughout the 1990s.[52] Explicitly estimating US distribution costs from equation (A6) resulted in the US distribution costs of the 2,116 films in the sample being 45 per cent of their US production costs and hence consistent with Vogel's estimates. Note also that in deriving these estimates it is implicitly assumed that revenues derived from ancillary markets are linearly related to those derived from theatrical release. While available data on film consumption in ancillary markets are not as comprehensive as those for theatrical release, Weinberg presents strong evidence supporting an assumption of a broadly linear association between a film's theatrical and ancillary revenues.[53] Consequently the rate of return measure used here for the 1990s is that derived from equation (A8), with parameter estimates for $1 + \alpha$ and β of 1.07 and 0.40, respectively, given the consistency between the resulting profitability and distribution costs estimates and 'industry wisdom'. The profits of these films generated in the US market can then be derived directly from equation (A7) where R is estimated real rental income generated by US distribution. However, the extent to which these profitability measures incorporate a number of approximations must be recognized, and hence the implications derived from them must be treated with some caution. Nonetheless, within an industry in which profitability data are very hard to come by, such approximations at least provide a starting point for an evaluation of economic performance.

[50] Vogel, *Entertainment industry economics*, p. 35.
[51] Ibid., p. 96.
[52] Ibid., tab. 3.2, p. 80.
[53] See Weinberg, 'Profits out of the picture', pp. 172–8.

