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Stardom and the Profitability of Film Making: Warner Bros. in the 1930s ⋆

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Abstract. This paper examines the film production performance of Warner Bros. during the 1930s, placing particular emphasis on the manner in which Warners invested in stars. Warners are shown to have acted rationally in the sense of having consistently invested in previously successful actors. An assessment is then made of how successful such a strategy proved to be. Drawing a distinction between high and medium/low budget production, the deployment of established stars in high budget productions did not appear to have constituted a successful strategy. The production of medium/low budget films, by contrast, provided a more stable environment, in which there were clear returns to the deployment of previously successful actors.

Key words: film industry, portfolio theory, risk, stardom

1. Introduction

The film industry provides a rich focus for applied economic analysis. The industry is a complex one, in terms of the nature of the product it produces, the variety of ways in which the product is distributed, and the evolving and innovative mechanisms that are used to maximise product revenue. The popular perception of the industry is one in which a high level of risk is inherent to the production process, but an industry none the less that can provide substantial rewards for the successful risk-taker. Indeed the industry actively encourages such a perception, together with the perception that the production process is akin to alchemy, in that it is incapable of precise specification.

In attempting to separate fact from fiction the economist is immediately faced with data problems. Superficially, a wealth of data is readily available, particularly data relating to the revenues generated by films, on a week by week and film by film basis.[1] Indeed the industry itself appears to believe that box-office revenue is the sole barometer of film success, although the cynic might argue that this is just a further example of the industry attempting to deflect detailed scrutiny of its performance. However on the cost side, only very limited data is available, thus precluding any detailed analysis of profitability. Production cost

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data (or "negative costs" in industry parlance) are available, but these are only estimates, although industry sources are confident that these are measured to within 10 per cent accuracy.[2] However, no data are available on distribution/promotion costs, and consequently identifying the profits generated by a film to any acceptable level of accuracy is a fraught business. This is certainly an issue that fuels considerable speculation, and there is a commonly held view amongst industry insiders that only 30 per cent of films produced in Hollywood today generate profits.[3]

Given the environment of risk that surrounds film production, and the manner in which this impacts upon film profitability, the rational film producer will seek to adopt a variety of strategies to attenuate risk. Prominent amongst these is the manner in which stars are developed and deployed across film products. Stars, it is argued widely, serve to attenuate the risks associated with film production by locating new products in aesthetic and pleasure domains already familiar to audiences. Steven Albert (1998, p. 251), for instance, argues that "stars are important because they are the least noisy and most consistent marker for successful film types". Tino Balio (1995, p. 144) goes so far as to claim that "stars create(d) the market value of motion pictures".

The importance attached to the notion of the "movie star" has a long history in the industry, and is almost as old as the industry itself. Indeed the transformation of the industry from the studio-based structure of the 1930s, 1940s and 1950s to the freelance structure of today can be attributed in part to stars exploiting their growing market power. There was strong pressure exerted by stars to break free from the constraints placed upon them by the tightly specified, long-term contracts of the studio era, thereby allowing them to capture, through net profit contracts, the economic rents associated with their success.[4]

This paper presents an analysis of the film making activities of Warner Bros. during the 1930s. The analysis places a particular emphasis on assessing the impact that stars had on profitability, and the extent to which the development and deployment of stars proved to be an effective risk-minimising strategy. The relevance of this historical analysis can be justified as follows. First, the period of analysis can be interpreted as one in which the star system reached maturity and that a direct lineage can be traced between the role of the star at that time and today. Second, the economic volatility of the 1930s provides an environment in which risk was an important, and indeed dominating, characteristic. Third, the tightly controlled structure of the studio system provides a stable institutional context for a detailed examination of various risk-minimising strategies. Finally, a comprehensive data set is available, consisting of production cost data that are derived directly from studio records.[5] We treat the studios as profit maximising firms that make a product from a combination of physical and human capital, much of which is artistic in nature, with the express purpose of generating a return on capital over and above normal profits. Stars are thus an input in a production function and constitute a major component in a firm's cost function. In the manner set down by Klein and

Leffler (1981) we envisage that the production company and the star are engaged in a game in which each adopts wealth maximising strategies.

The structure of the remainder of this paper is as follows: In the next section a brief literature review is presented. There then follows a discussion of the risk environment that Warners faced during the 1930s. An analysis of the manner in which Warners developed and deployed their actors forms the next section, with a similar analysis then presented with regard to the deployment of directors and the genre composition of annual film portfolios, as alternative risk attenuating mechanisms. A final section presents an assessment of the success of these risk-controlling strategies, and in particular, the implications that these had for profitability.

2. Literature Review

A number of studies have been published recently that have attempted to evaluate the precise impact that stars have on the success of film production. De Vany and Walls (1999), using a sample of over 2,000 films produced between 1984 and 1996, suggest that a strategy of using high profile stars has limited and very uncertain returns. Thus while there is evidence that a very small number of stars can have a positive impact on profitability, this is not the norm. They conclude that given the extent to which film production is dominated by risk there would appear to be no single strategy that can be adopted by film producers to control this risk, least of all the extensive use of stars. Indeed they write, "We conclude that the studio model of risk management lacks a foundation in theory or evidence. Revenue forecasts have zero precision, which is just a formal way of saying that 'anything can happen' " (1999, p. 286). Ravid (1999), using a smaller sample, but a more extensive set of independent variables, reaches a similar conclusion. Albert (1998), on the other hand, while also concluding that it is only a small handful of stars that can be identified as being successful, argues that these stars none the less can be seen as being consistently successful, and therefore do represent the focus for a coherent risk-minimising strategy. This is consistent with Rosen's concept of "superstardom" where the combination of rising incomes and the widespread diffusion of technical progress is sufficient to generate an ever growing consumer demand for quality, leading to "the marked concentration of output on those few sellers who have the most talent" (1981, p. 847). Rosen, like Hamlen (1991, 1994), treats talent as an objective entity consisting of unique but measurable inputs that are not readily substitutable. Adler (1985), however, maintains that no difference in talent need be involved between stars and non-stars, hence drawing attention to the function of stars in lowering audience search costs. However, in contrast to De Vany and Walls and Ravid, Albert worked only with box-office revenues rather than profits, which may explain, in part, his more positive conclusions (see Sedgwick and Pokorny, 1999; Albert, 1999).

In terms of historical studies of stardom these have tended to place less emphasis on detailed quantitative analyses, and have emphasised the broader context within

which the star system operated. Thus stars could be interpreted as having been used to raise the profile of the industry as a whole and to maintain and extend this profile in the marketplace. As Kerr (1990, p. 387) argues when explaining how Adolph Zukor and others reshaped the American film industry between 1912 and 1916:

> His product was the film star who became simultaneously a focal point for the construction of narratives within the film and for management coordination throughout the industry. The new star formed a synergistic link between film as an aesthetic form and as a product of corporate industry.

One difficulty with studies that focus on profitability, or success, on a film by film basis, such as the studies by De Vany and Walls (1996, 1999), Ravid (1999) and Albert (1998), is that no attempt is made to identify and evaluate strategies that are adopted by studios or film producers across their portfolio of films. That is, in the course of a year, say, a producer or studio will produce a number of films, associated with each of which will be a perceived level of risk. The objective of the producer will be to maximise the return over this entire portfolio of films, and the budgets allocated to each film will be determined with reference to the distribution of risks across these films. That is, to judge a single film purely in terms of the profits it generates is to assess this film outside of the context within which its budgetary allocation was made. These ideas are developed more fully in Sedgwick and Pokorny (1998).

This paper attempts to evaluate stardom as a strategy, but places an emphasis on a portfolio interpretation. That is, it places the discussion within the context of the theory of the firm and takes as its point of contention the argument quoted earlier from De Vany and Walls that no sensible risk averting strategy is available to film producers. The historical context allows for a deeper understanding of the business strategies employed during the period when Hollywood had evolved into a well-established and modern industry.

3. The Risk Environment of Film Making during the 1930s

Although only established as a film producer in 1921, Warners was by 1930 one of the big five vertically integrated players in what is considered generally as a mature oligopoly – the others being MGM/Loews, Paramount, Fox (20th Century Fox from 1935), and RKO (see Balio, 1995). During the period 1931/32 to 1938/39 Warners released 441 films for general distribution, an average of 55 films each year, with a minimum of 52 films in 1931/32 and a maximum of 58 films in both 1935/36 and 1936/37. Annual production budgets ranged from $15.4 million in 1932/33 to $28.1 million in 1937/38 (all expressed in 1929 prices).

A general understanding of the nature of the risk environment of film production during the 1930s can be derived from scattergraphs of the box-office revenues and rates of return against film production costs, generated by each of the 441 films Warners produced over the period. The data are derived from the William Schaefer

ledger of production costs and box-office revenues of feature films released by Warners between 1922 and 1951. However, a weakness of the data set is the absence of information on distribution costs, thereby precluding the derivation of the net profits associated with each film and hence film rates of return. The approach taken by Sedgwick and Pokorny (1998) was to make reference to a parallel data set on the films released by RKO over the same period (see Jewell, 1994), which contained data on film profits, thereby allowing the derivation of distribution costs. These data exhibited a clear and strong correlation between distribution costs and box-office revenues of 0.97, with distribution costs representing 37% of revenues, on average. This ratio was applied to the Warners' revenue data, allowing for the estimation of distribution costs, and hence net profits and rates of return.

However, in order to avoid this estimation approach, a somewhat different approach will be taken here. Let C_i denote the production cost (negative cost) of film i, R_i the box-office revenues generated by film i, D_i the distribution costs associated with film i and P_i the net profits generated by film i, where P_i is defined as $R_i - C_i - D_i$. Consider as a film rate of return measure the ratio of net profits to production costs, that is:

$$RR_i = \frac{R_i - C_i - D_i}{C_i}. \tag{1}$$

Thus note that this is not a strict rate of return measure, as the denominator consists of only one component of total costs – production costs. However, the argument here is that in judging the success of a film reference will be made to the profits generated by the film relative to its production costs, the component of total costs which is the focus of decision making by the producer. Distribution costs are largely out of the producer's control, evolving over time in response to the film's success. In the simplest cases of distribution costs either being directly proportional to box-office revenues, such that $D_i = \alpha R_i$, or distribution costs being determined initially as a fixed proportion of production costs, and thereafter evolving in direct proportion to revenues, such that $D_i = \beta C_i + \gamma R_i$, then Equation (1) collapses to:

$$RR_i = \frac{\lambda R_i}{C_i} - \delta \tag{2}$$

which will be perfectly correlated with the simple ratio of box-office revenues to production costs.

If distribution costs consist of a strict fixed cost component, such that:

$$D_i = \alpha + \beta C_i + \gamma R_i \tag{3}$$

then substitution into Equation (1) will produce an expression that while not perfectly correlated with the ratio of revenues to production costs, will still be highly correlated with it, provided that α is relatively small.

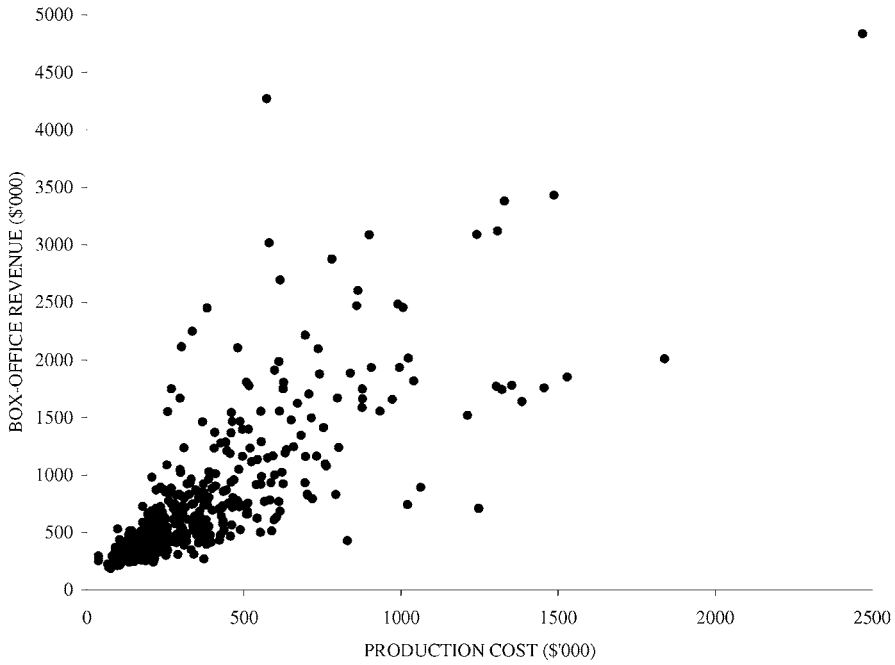

Figure 1. Box-office revenue against production cost, 1931/32 to 1938/39 (1929 prices).

Consequently the main performance measure used in the remainder of this paper will be the ratio of box-office revenues to production costs, on the assumption that this measure is highly correlated with the rate of return measure defined in Equation (1). We will denote this measure by RC. As a final justification for the use of this measure we can consider a comparable data set on all the films produced by MGM and RKO over the same period, in which actual profit and hence distribution cost data are available.[6] In total these two data sets contained 670 films, for each of which the ratio of box-office revenues to costs was derived (RC_i) and the ratio of profits to production costs was also derived (RR_i). The correlation between these two measures, across all 670 films, was 0.992, providing a very strong justification for interpreting RC_i as directly reflecting film rates of return, and hence for using RC_i for the Warners' data as a rate of return measure.

Figure 1 presents a scattergraph of box-office revenues against film production costs, and Figure 2 presents a scatter of RC_i also against film production costs, for each of the 441 films Warners produced over the period (all monetary aggregates are expressed in 1929 prices). From Figure 1 it can be seen that revenues increased with production costs, but with increasing variability. Figure 2 exhibits a broadly negative (and non-linear) association between rates of return and production budgets. In particular, there was a tendency for low to medium budget films to generate very high RC values, but for high budget films to generate relatively low RCs.

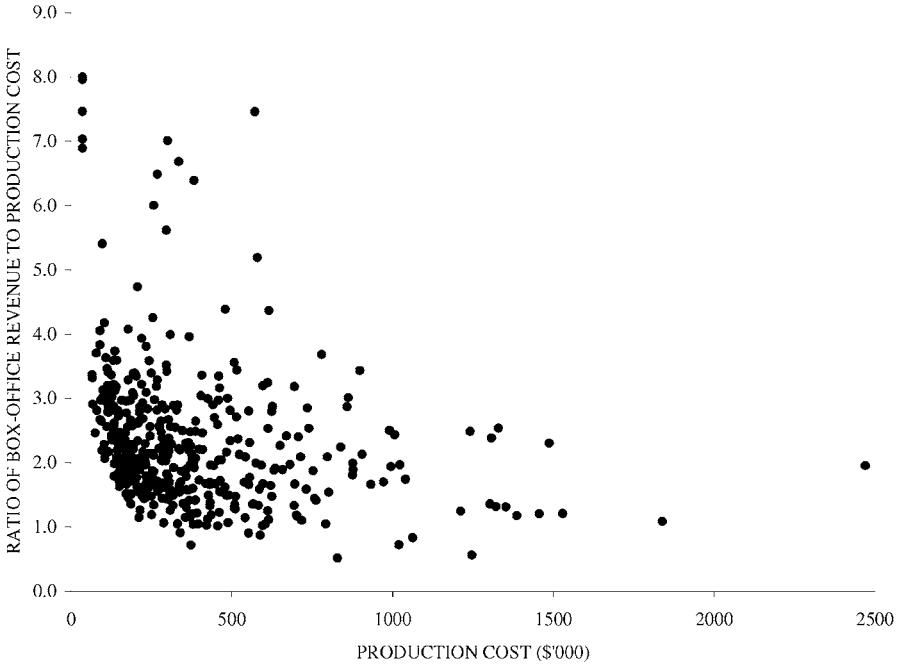

Figure 2. RC_i against production cost, 1931/32 to 1938/39 (1929 prices).

Figures 1 and 2 are also useful for emphasising how misleading it can be to rely on box-office revenues alone as a measure of film success. High box-office revenues did not necessarily imply high *RC*s, and indeed some high revenue earning films actually produced losses. This can be illustrated by considering the two most expensive films that Warners produced over the period – *The Adventures of Robin Hood*, produced at a cost of $2.5 million, and *Juarez* which cost $1.8 million. *The Adventures of Robin Hood* was Warners' highest grossing film of the entire period, generating revenues of $4.8 million, and hence an *RC* value of 1.9, sufficient presumably for the film to produce a net profit, but not a particularly outstanding one in rate of return terms. In the case of *Juarez*, although the box-office revenue at $2 million was relatively high, the high production costs resulted in a poor *RC* value of 1.1, which would have been insufficient to have generated a positive net profit. In other words, while box-office revenue can be interpreted as a direct reflection of film popularity, it does not follow that a popular film, in an absolute sense, is necessarily a profitable one, emphasising the sensitive relationship between production costs, revenues and profitability.

Sedgwick and Pokorny (1998) interpreted the setting of annual budgets as a two-stage process. First the global budget was set, and this appeared to be set essentially in response to the aggregate rate of return performance of the previous year's budget – high aggregate rate of return performance would stimulate an expansion in the budget, whereas low rate of return performance would result in

a contraction of the budget. Once the global budget was set, a decision had to be taken as to the number of low budget, medium budget and high budget films that were to be produced. The approach taken was to interpret this process in terms of portfolio theory. Thus while there were greater risks associated with high budget production, it was higher budget films that were capable of generating high profits, thereby making a significant contribution to the annual profit target. Conversely, low budget production, while being less risky, in the sense of being less likely to generate losses, could only generate limited profits.

It is therefore important to recognise the constrained nature of annual film production. Given an annual production budget, determined by the corporation's East Coast office's assessment of its in-house exhibition requirements, the studio was charged with producing a balance of films that would sustain its in-house cinemas. A strategy of low to medium budget production only would make Warners dependent on acquiring principal attractions from rival studios and therefore vulnerable to opportunistic behaviour. In addition such a strategy would result in an underspend on its annual production budget, given the limitations on the outlets for low to medium budget films. In producing its own big budget films the studio privileged its in-house exhibition wing with a set of films which would draw audiences away from cinemas owned by rival corporations or, better still, be sufficiently popular with audiences to play on rival screens for a rent.[7] However, as can be seen from Figures 1 and 2, making a principal attraction was not simply a matter of producing expensive films with high presentation standards. The process can best be interpreted as one of maximising the rate of return on the global budget, subject to an output constraint, an inverse relationship between production budgets and rates of return, and an aggregate production budget allocated by the East Coast office. In other words, it was perfectly rational and consistent to produce high budget films, which generated low and highly variable rates of return, while at the same time maximising the rate of return on the aggregate production budget – a number of high budget films had to be produced in order to absorb the annual budget. The key was getting the balance right between low, medium and high budget production, given the nature of the production constraints, and the distribution of risk across budgetary categories.

4. The Allocation of Warners' Annual Film Budget by Actor

In order to gain some insight into the manner in which Warners deployed their stars in the 1930s, Table I presents a set of statistical summaries, for those actors who appeared in films which in aggregate accounted for more than 2.5 per cent of total production budgets over the sample period.[8] A first observation which can be made from the table is how intensively many of these actors were worked during the period, with Blondell, Brent, Davis, Farrell and O'Brien appearing in over 30 productions for the studio, with another five featuring in more than 25. In terms of the share of production costs the leading actors were Powell (Dick), Brent,

Davis, O'Brien, de Havilland and Blondell. In the cases of Blondell, Brent, Davis and O'Brien this relatively large share of production costs derived from frequent appearances in medium budget films, whereas in the case of de Havilland the large share derived from relatively few appearances in very high budget films. Powell's large share derived from relatively frequent appearances in higher budget films, particularly musicals. However, in terms of *RC*s, these were relatively poor for those films in which Brent, de Havilland and Powell appeared. The highest *RC*s were generated by films in which Cagney, MacMahon, Keeler, Kibbee, Bogart and Lindsay appeared. The real stars for the studio during these years were those artists whom they entrusted to carry their super "A" productions: a list that narrows down to Rains, de Havilland, Flynn, Keeler, and Powell during the early years, Muni during the later years and Davis in the last year of the period (see discussion of Table II below).

Of further note from Table I is that Rains appeared in the highest budget films, but achieved the lowest *RC*. Similarly, Louise also appeared in relatively high budget films, but these achieved a low overall *RC*. Conversely, both Flynn and Keeler appeared in high budget, high *RC* films, although in the case of Keeler there was considerable variability in the *RC*s of the films in which she appeared reflecting her declining appeal after 1934. The films in which Brown appeared achieved relatively high but remarkably consistent *RC*s.

In order to gain some insight into the variation in *RC*s over time, Table II presents annual shares and *RC*s for the more prominent actors from Table I, and specifically, for those actors whose films accounted for more than 6.5 per cent of production budgets over the sample period. The table also shows, for each year, the average cost of the films in which each actor appeared relative to the average cost of all films produced in the given year (multiplied by 100). This relative average cost measure can be interpreted as an index number, so that a value of 150, say, would indicate that the average cost of the films in which actor i appeared in year t exceeded the average cost of all films produced in year t by 50 per cent.

From Table II it can be seen that Blondell, Cagney and Davis achieved high and relatively consistent *RC*s over the first half of the sample period, although there was considerable variation in budget shares from year to year. O'Brien and Powell also performed strongly during the early to mid-thirties, while Brent and Francis exhibited considerable variation in annual *RC*s. Flynn, de Havilland and Rains were all brought in in the 1934/35 season as high profile stars (although at that stage they were relatively unknown), as Warners made a concerted move into high budget film production (the average cost of the 5 most expensive films in 1934/35 was $1,041,000 compared to $743,000 in the 1933/34 season). While the films in which de Havilland and Rains appeared generated high *RC*s in this initial year, the performance of their films thereafter was much weaker, this being particularly so in the case of Rains. By contrast Flynn exhibited consistent and strong performance even in the poor overall performance year of 1937/38. Note also that in order to accommodate these three new stars, a number of established

Table I. Summary statistics of film appearances by actor, 1931/32 to 1938/39, 1929 prices

Actor	Number of films	Average production cost per film ($'000)	Coefficient of variation of production costs (%)	Share of total production costs of films in which actor appeared (%)	Ratio of sum of revenues to sum of production costs (*RC*)	Coefficient of variation of film *RC*s (%)
Astor, M.	15	288.7	60.8	2.7	2.1	26.0
Blondell, J.	35	403.2	54.8	8.7	2.4	44.8
Bogart, H.	20	432.4	46.2	5.3	2.5	44.7
Brent, G.	32	465.5	71.8	9.1	1.9	39.1
Brown, J.E.	13	348.6	20.6	2.8	2.3	13.6
Cagney, J.	22	486.0	58.8	6.6	3.0	45.2
Davis, B.	33	444.2	82.1	9.0	2.3	35.8
de Havilland, O.	14	1042.1	55.8	8.9	1.9	58.4
Dvorak, A.	20	262.5	46.5	3.2	2.4	49.8
Farrell, G.	37	256.0	68.2	5.8	2.4	39.4
Flynn, E.	12	989.2	35.7	7.3	2.3	33.9
Foran, D.	20	226.1	93.7	2.8	2.0	24.2
Francis, K.	28	421.7	39.9	7.2	2.0	36.0
Keeler, R.	8	734.7	22.2	3.6	2.6	46.5
Kibbee, G.	26	285.2	67.1	4.5	2.5	50.0
Lindsay, M.	28	354.7	77.0	6.1	2.5	40.6
Louise, A.	11	604.5	64.8	4.1	1.8	48.7
MacMahon, A.	18	292.2	42.3	3.2	2.6	63.3
Muni, P.	8	598.8	85.4	2.9	2.2	61.7
O'Brien, P.	31	472.3	44.6	9.0	2.2	52.3
Powell, D.	26	698.3	46.0	11.1	1.9	50.3
Rains, C.	11	1123.0	56.2	7.6	1.6	35.3
Robinson, E.G.	14	454.0	33.7	3.9	2.4	24.2
Sheridan, A.	16	352.1	83.8	3.5	2.1	27.8
William, W.	28	271.0	41.7	4.7	2.2	55.0

Source: William Schaefer Ledger.

actors experienced sharp reductions in their budget shares between the 1933/34 and 1934/35 seasons, notably Blondell, Cagney, Davis, Francis and Powell.

The relative average cost data in Table II offer further insights into the manner in which Warners deployed their actors over the period. Thus Flynn, de Havilland and Rains were immediately placed in high budget productions, their films being over twice as costly as the average in 1934/35, and in the case of Rains four times

Table II. Share of annual production budgets, annual ratio of revenues to production costs and relative average production costs by actor, 1931/32 to 1938/39

Year	Blondell			Brent			Cagney			Davis			de Havilland		
	Share (%)	*RC*	Relative av cost	Share (%)	*RC*	Relative av cost	Share (%)	*RC*	Relative av cost	Share (%)	*RC*	Relative av cost	Share (%)	*RC*	Relative av cost
1931/32	10.7	2.0	92.8	10.3	1.8	89.5	5.4	2.7	93.4	7.3	2.3	95.1	–	–	–
1932/33	11.4	3.8	106.9	12.1	3.0	112.9	5.4	2.7	101.3	10.5	2.8	98.2	–	–	–
1933/34	17.8	2.6	136.8	4.2	2.0	76.1	12.1	3.5	131.0	8.6	2.5	77.5	–	–	–
1934/35	5.7	2.7	77.2	3.9	2.2	70.0	6.9	5.1	92.6	4.7	2.9	84.0	16.7	2.7	225.5
1935/36	10.2	2.1	147.3	4.7	1.9	90.6	11.7	2.1	226.7	8.6	2.4	99.2	13.1	1.9	378.7
1936/37	12.3	2.0	178.7	11.1	2.0	160.4	–	–	–	4.4	3.5	128.7	2.9	1.0	167.6
1937/38	3.5	2.3	98.4	15.5	1.4	217.2	2.6	1.1	143.2	8.3	1.8	154.7	19.0	1.5	265.9
1938/39	3.6	1.4	95.5	8.7	2.0	154.4	9.7	2.9	171.4	17.3	1.8	229.2	10.5	2.0	185.3
Year	Flynn			Francis			O'Brien			Powell, D.			Rains		
	Share (%)	*RC*	Relative av cost	Share (%)	*RC*	Relative av cost	Share (%)	*RC*	Relative av cost	Share (%)	*RC*	Relative av cost	Share (%)	*RC*	Relative av cost
1931/32	–	–	–	5.1	1.6	89.7	–	–	–	–	–	–	–	–	–
1932/33	–	–	–	5.7	3.2	106.7	–	–	–	4.1	2.4	115.9	–	–	–
1933/34	–	–	–	12.8	2.6	138.1	8.6	3.0	77.4	21.4	2.8	192.6	–	–	–
1934/35	7.6	2.3	205.4	6.8	1.8	122.6	17.3	2.8	133.2	12.9	2.4	174.6	7.4	2.3	399.1
1935/36	6.8	2.5	396.2	7.3	2.4	140.3	10.9	2.4	126.5	19.7	1.7	229.0	5.2	0.7	304.1
1936/37	11.1	2.3	214.9	11.7	1.7	169.7	6.6	1.8	127.3	11.0	1.9	212.0	10.1	1.7	195.1
1937/38	11.0	2.1	307.5	4.7	1.3	87.6	11.8	1.4	132.3	12.2	1.3	228.4	16.7	1.6	311.8
1938/39	13.8	2.4	183.3	5.4	1.4	71.0	11.1	2.0	117.7	6.7	1.3	118.8	11.7	1.6	206.7

Source: William Schaefer Ledger.

as costly. This relative average cost index, therefore, can be interpreted as an index of "stardom", in the sense that it reflects the relative level of investment that the studio was prepared to make in each actor. Interpreting (somewhat arbitrarily) a value for this index in the region of 200 or more as reflecting star-level investment, Flynn, de Havilland and Rains can be seen to have been used exclusively as stars. Powell could also be interpreted as a star, and certainly so from the mid-thirties. Brent and Cagney experienced brief periods of stardom. An interesting case is that of Bette Davis. Used in averagely costed productions for most of the sample period, productions that consistently generated high *RC*s, it was only in the late thirties that she attracted star-level investment.

Perhaps the most interesting aspect of these data, however, is how unsuccessful were the films in which many of these stars appeared, with the single and notable exception of Flynn. Thus apart from initial success, the films of de Havilland and Rains were notably unsuccessful. Once Powell began to appear in high budget productions there was a marked reduction in his *RC*s, and Davis' films exhibited a sharp reduction in *RC* as the relative cost of these films were increased.

The information in Tables I and II can be captured and summarised within a regression model framework. However, it is useful first to consider the institutional context within which stars were deployed in Hollywood in the 1930s.

5. Institutional Context

The market value of a star as a commodity is determined predominantly by the relative box-office success of his or her previous films. Accordingly, it could be expected that the value of a star who had appeared in a set of films with growing net box-office returns would be rising, whilst that of a star whose films have performed relatively badly at the box-office would be in decline. The ability of a contract to reflect this value is dependent upon its term structure. A seven year term contract held by a studio during the classical Hollywood period would be re-configured to reflect the rising value of a star.[9] Such a process favoured the studio, particularly where a significant portion of the term was still to run. A star in decline, on the other hand, was vulnerable to the decision not to continue with the option to retain her or his services.[10] In contrast, the rewards of a freelance star are much more likely to reflect market value, since rival producers will be engaged in a bidding game to secure his or her peculiar qualities.

Under the circumstance that the vertically integrated majors during the classical period required upwards of 50 films per season during the 1930s, it is not surprising that the studios adopted a corporate approach to the resource co-ordinating problem: they chose to internalise the process through a set of term contracts, rather than acquire human resources for the express purpose at hand through the market. This logic is apparent in studios' dealings with stars. The internal authority structure enabled studio executives to systematically plan for and direct the activities of those idiosyncratic assets under contract. (This often led to disagreements between stars

and their executives concerning the appropriateness of the film vehicles to which the former were directed.) It also reduced the risks associated with not securing the contracts of desired artistes, where substitution was problematic, since studios maintained what were in effect stock companies of players.

In contrast, even where successful, the competitive market price necessary to secure a bundle of star and player inputs at any one moment, together with the additional transaction costs associated with constantly seeking such idiosyncratic inputs, project after project, through the market mechanism, imposed marked uncertainty upon the film-making process and may have significantly and adversely affected the box-office to production cost ratio. In effect the major studios in the classical period were able to expropriate a proportion of the economic rents generated by their stars and in so doing attenuate the risks associated with film production. They did this by paying them less through their term contracts than the price that would have been necessary to secure their services on the open market. One measure of this was the fee obtained from loaning out a "star" to another studio which invariably resulted in wages plus a payment to the home studio.[11]

The foregoing discussion implies that the resource switching between actors which is apparent from Table II can be explained, at least in part, by the past financial performance of the films in which those actors appeared. It would also appear that this resource switching was prompted by *RC* performance. Sedgwick and Pokorny (1998), in examining the factors which influenced the annual change in the total production budget, identified rate of return performance as the major influence. Thus, the proportionate change in the production budget from year $t-1$ to t, appeared to be determined largely by the rate of return achieved on the production budget in $t-1$.[12]

The focus of interest here is the share of the annual production budget which is absorbed by the films in which actor i appeared in year t (in contrast to the level of the production budget which would be subject to a range of exogenous influences). Specifically, an explanation is required, not so much for the level of this share, but for the proportionate change in this share from year $t-1$ to year t. Thus during $t-1$, when the budgets were set for year t, three potential influences on this budget setting process can be considered. First, it might be expected that resources would have been diverted to those actors whose films achieved high *RC*s in $t-1$, and in particular, high *RC*s relative to the *RC*s of the films of other actors.

Second, given *RC* performance, those actors who achieved more consistent performance – the *RC*s of their films exhibited relatively low variability – might have been interpreted as having been less risky and attracted an increasing share of resources.

Finally, while the *RC* of an actor's films might be interpreted as being influenced by the actor's popularity, presumably there were actors whose popularity was only beginning to emerge during $t-1$. However, this emerging popularity would not at that stage have been reflected fully in the *RC* in $t-1$, nor indeed necessarily in the film revenues – such actors may only have begun to appear in relatively low

budget, low revenue films. The studio would have been aware of this emerging and potential popularity, from a range of informal sources, and therefore it would have been rational to invest in such actors immediately, rather than to wait until this popularity was translated ultimately into *RC* performance. This argument has been made by Altman (1999, p. 41):

> ... it is important to note that overall financial figures are not as useful to the Producer's Game as initial box-office strength. Producers cannot react rapidly to current trends if they must wait a year for complete domestic figures or even longer for foreign returns. Information on initial East and West Coast runs thus looms much larger in production logic.

The influence here is *expected* future *RC*s, which in turn will be related to the extent to which revenues for the actor's films were expected to increase between $t-1$ and t. Therefore in $t-1$ the studio would have expected their emerging actors to generate higher (relative) box-office in t than in $t-1$, and would have invested more in such actors. In particular, the average revenue of the films in which emerging actor i appeared in t (relative to the average revenue of all films in t) would have been expected to have exceeded the average revenue of the films in which s/he appeared in $t-1$ (relative to the average revenue of all films in $t-1$). Therefore a direct measure of this expectation would be the actual proportionate increase in actor i's relative average film revenues between $t-1$ and t. Strictly, this is an *ex post* expectations measure and can be interpreted, informally, as a rational expectations measure. However, it is clearly an imperfect measure, there being a tendency for its statistical significance to be overstated. Nonetheless it is the best measure available, given that such an influence on the investment decision was a relevant one, and must necessarily have been forward-looking rather than backward-looking.[13]

In terms of a regression model framework, the dependent variable is the proportionate change in the share of the annual production budgets of the films in which actor i appeared between $t-1$ and t. Measuring this change as the change in the natural logarithm of the shares, this variable is denoted by $\Delta \ln SHARE_{it}$. In terms of the independent variables, relative *RC* performance is measured as the ratio of the *RC* achieved by all the films in which actor i appeared in $t-1$ to the *RC* achieved by the total production budget in $t-1$. Denote this variable by $RELRATE_{i(t-1)}$. The relative risk associated with actor i is measured as the ratio of the coefficient of variation of the *RC*s of the films in which actor i appeared in $t-1$ to the coefficient of variation of the *RC*s of all films in $t-1$.[14] Denote this variable by $RELRISK_{i(t-1)}$. Finally, the emerging relative popularity of actor i is measured as the change in the natural logarithm of the relative average revenue of the films in which actor i appears between $t-1$ and t. Denote this variable by $RELPOP_{it}$.

Equation (4) in Table III presents the regression results, and it can be seen that all coefficient signs are as expected, and all coefficients are significant. Note that the 175 observations in Equation (4) refer to the annual actor budget share changes for which a full set of sample observations was available.

Table III. Regressions for the annual proportionate change in production budget shares allocated to actors, directors and genres

Independent variables	Equation (4) Actors $\Delta \ln SHARE_{it}$ Coefficient (Standard error)	Equation (5) Directors $\Delta \ln SHARE_{it}$ Coefficient (Standard error)	Equation (6) Genres $\Delta \ln SHARE_{it}$ Coefficient (Standard error)
CONSTANT	–0.889[a]	–0.832[a]	–0.302
	(0.208)	(0.281)	(0.403)
$RELRC_{i(t-1)}$	0.823[a]	0.886[a]	0.904[a]
	(0.175)	(0.249)	(0.284)
$RELRISK_{i(t-1)}$	–0.279[b]	–0.275[c]	–0.793[a]
	(0.117)	(0.149)	(0.251)
$RELPOP_{it}$	0.881[a]	0.878[a]	0.618[a]
	(0.092)	(0.165)	(0.160)
R^2	0.403	0.298	0.507
n	175	87	38

[a] Significant at the 1% level.
[b] Significant at the 5% level.
[c] Significant at the 10% level.

This regression equation should be interpreted with some care. It certainly does not purport to provide a full explanation of the determinants of budget share allocations. This is borne out by the relatively low R^2 statistic. Undoubtedly there was a range of subjective and speculative considerations that influenced such allocations, which in a sense were inherently unpredictable, given the constant pressure to innovate and stimulate "surprises" in audiences. Rather, what the regression implies is that Warners made such decisions against a background in which clear reference to past financial success was made, in which there was an element of risk aversion (the negative coefficient on $RELRISK_{i(t-1)}$), but also mindful of future opportunities: it describes a context within which the studio managed its set of star assets.

For instance, at some point in the 1937/38 season Table II suggests that the studio's management, in doubling the proportion of the global film-making budget allocated to the films in which Bette Davis appeared, decided to bet heavily in elevating her to principal star status: as a star capable of carrying super "A" productions. No doubt the build up in *RC* performances in the preceding years helped the studio to this decision. Further, although her films appeared to have performed poorly during the 1937/8 season this should be read in the context of the fall in demand for films in general during that year[15] and that when compared to the *RC*s

of other stars during that year – a factor integral to Equation (4) in Table III – her performance suggests that indeed her popularity held up.

5.1. THE ALLOCATION OF ANNUAL FILM BUDGETS BY DIRECTOR AND GENRE

A similar analysis to that presented above for actors in Tables I and II was also performed for directors and genres, although a detailed discussion of these analyses will not be presented here. Equation (5) in Table III presents the equation analogous to Equation (4), where budget shares now refer to the share of production budgets allocated to directors. Thus all coefficients are of the expected signs and are significant. Again, these regressions provide clear evidence of reference having been made to past financial success in allocating production budgets across directors, although such an explanation is necessarily a partial one, and a weaker one than in the case of explaining actor budget shares, given the relatively low R^2 statistic. It would appear that in deciding upon which film properties directors were allocated in any single season, cognisance of the returns to their films, the variability of those returns, and the growth in their popularity, all relative to the season's average, were important factors for the studio's executives.

Genre composition forms the final aspect of this investigation into the influences on the portfolio composition of film products at Warners. In his account of Hollywood's commercial development, John Izod explains that genre classifications perform the essential task of codifying the film product, enabling audiences to form expectations easily, and understand the experience of cinemagoing. For Izod (1988, p. 56) genre enables "the uniqueness of the product to be strikingly de-emphasised". However, in contrast to the objective nature in which actors and directors can be identified, defining the genre of any given film necessarily involves elements of arbitrariness and subjectivity.

For the purposes of this investigation a genre classification is required which produces genre categories with sufficient observations for valid statistical analysis. An initial genre categorisation of the 441 films that Warners produced during the period produced 27 genre categories. These 27 categories were aggregated into just 7 categories, the core categories being "drama", "comedy", "crime", and "musical". Those films "with songs" (such as "drama with songs", "comedy with songs") were classified into a separate category (films with songs). The remaining films (of which there were just 50) were divided into two further categories. The first was defined as "prestige" films. These films, in one-off genre categories, were for the most part designed to be the "hits" of the season and were intended to be attractive to both the exhibition wings of rival companies as well as independent cinema owners.[16] These films had relatively high budgets, were innovative in nature, and were promotional vehicles for the studio's popular stars of the time. The final category of films was simply classified as "miscellaneous".[17]

Equation (6) in Table III presents the results of the genre budget share regression. Thus the dependent variable would now reflect the annual proportionate change in production budget shares allocated to each genre. Again, all coefficients are of the expected sign and significant.

While the results in Equation (6) provide evidence of annual genre composition evolving in response to a set of financial factors, the static nature of the genre composition used must be recognised. Thus Equation (6) cannot explain the emergence of new genres or the extent to which Warners anticipated changing consumer tastes. In part, such innovation is reflected in the "prestige" category, and the performance of this category can be interpreted as indicating how successful such innovation was, but without explaining what motivated it.

6. Stardom and Film Profitability

Given the extent to which Warners invested in previously successful actors, the central issue is how profitable such a strategy proved to be. This issue can be examined by assessing the extent to which the profitability of a film, as reflected in its *RC* value, can be explained directly in terms of the past success of the actors who appeared in the film, while standardising for a range of other factors that may have impacted upon film profitability.

The discussion of the previous sections would imply that Warners expected film profitability to have been related positively to the previous *RC*s generated by the film's stars, director and genre. Similarly, the use of emerging stars, directors and genres should also have contributed positively to profitability. The impact of risk is perhaps not so clear-cut. While it may have been the case that Warners were reluctant to invest in high risk stars, directors and genres, *cet par*, this is not to suggest that there may not have been some return to risk taking.

Thus consider a regression equation which explains the variation in the *RC*s of the films in the sample. The previous success of the director of film i in year t can be measured by the aggregate *RC* of all the films which the director directed in year $t-1$. Therefore, for all films in the sample a variable was constructed which measured the *RC* achieved by the director's films in the previous year. Denote this variable by $DIRRATE_{i(t-1)}$. Similarly, for genre, a variable was constructed which measured the *RC* achieved by the genre's films in the previous year. Denote this variable by $GENRRATE_{i(t-1)}$. Finally, the potential contribution of the actors in the film can be measured by the *RC*s that their films achieved in the previous year. Now as a given film can have up to four (or even more) main stars an issue arises as to how, in aggregate, the previous success of the film's stars is to be measured. The approach taken here is to assume that it was only the first two named stars of any given film that provided the focus for consumer interest. Therefore the previous success of the stars of a given film was measured as the average of the aggregate *RC* achieved by the films of the two main stars in the previous season.[18] This variable is denoted by $STARRATE_{i(t-1)}$.

The emerging popularity of a film's stars, director and genre were measured in an analogous manner to the popularity measures derived in the previous sections, although for present purposes absolute rather than relative measures are appropriate. Thus the popularity of the director of film i in year t is measured as the proportionate increase in the average revenue of the director's films between $t-1$ and t. Denote this variable by $DIRPOP_{it}$. Similarly, the emerging popularity of the film's genre is measured as the proportionate increase in the average revenue of the genre's films between $t-1$ and t, and is denoted by $GENRPOP_{it}$. In the case of the emerging popularity of the film's stars again only the first two named stars are considered. The variable is measured as the average of the proportionate increase in the average revenues of each of the two star's films between $t-1$ and t, and is denoted by $STARPOP_{it}$. In all cases these popularity variables are measured in constant prices and in differenced logarithm form.

Finally, the risk associated with a film's stars, director and genre in year t is measured by the coefficient of variation of the respective *RC*s in $t-1$. In the case of the film's stars this is measured as the average of the coefficients of variation achieved by the first two named stars. These variables are denoted, respectively, as $STARRISK_{i(t-1)}$, $DIRRISK_{i(t-1)}$, and $GENRRISK_{i(t-1)}$.

In terms of the dependent variable, the natural logarithm of *RC* is used, given the inherent non-linearity in *RC* as reflected in Figure 2. Using the logarithm also has the added advantage of adjusting for the mild skewness in the *RC* values, thereby producing normally distributed regression residuals.

Equation (7) in Table IV presents the basic regression model for the 225 films in the sample for which a full set of observations was available.[19] The significance of the regression coefficients are evaluated within the context of White's heteroscedasticity-adjusted standard errors, the presence heteroscedastic disturbances having been indicated in the simple OLS estimate of the model.[20] Thus film (*LOG*) *RC*s were influenced positively through the use of previously high *RC* performing actors and directors, and through the use of emerging actors, directors and genres. Risk taking did not appear to exert a significant influence on film *RC* performance.

In order to evaluate the robustness of these results Equation (8) in Table IV includes four control variables. The first is the production cost of film i in year t (in 1929 prices), and is included to standardise for the tendency for low budget films to generate relatively high rates of return, *cet par*, alluded to in the discussion of Figure 2 above. Given the non-linear relationship between film *RC*s and production costs apparent from Figure 2 this variable is included in logarithmic form, and is denoted by $LOGCOST_{it}$. The second control variable is the rating allocated to film i in year t, by the Motion Picture Guide.[21] All films have been rated on a 6 point scale (0 to 5 – 0 signifying "not worth a glance" and 5 "a masterpiece"), in increments of 0.5. These ratings purport to provide an objective assessment of the artistic worth of the film, in terms of the quality of the acting, direction, script and technical achievement. The variable can be interpreted as capturing the complex

Table IV. Regression for film *LOG RC*s, all films

Independent variables	Equation (7) Coefficient (White's adjusted standard error)	Equation (8) Coefficient (White's adjusted standard error)
CONSTANT	467.300[a]	533.560[a]
	(15.542)	(40.725)
$STARRC_{i(t-1)}$	0.142[a]	0.087[b]
	(0.040)	(0.035)
$DIRRC_{i(t-1)}$	0.124[a]	0.065
	(0.045)	(0.041)
$GENRRC_{i(t-1)}$	0.034	0.050
	(0.062)	(0.050)
$STARPOP_{it}$	23.227[a]	21.689[a]
	(5.917)	(5.097)
$DIRPOP_{it}$	17.489[a]	14.542[a]
	(4.836)	(4.349)
$GENRPOP_{it}$	18.134[b]	15.514[b]
	(7.456)	(6.878)
$STARRISK_{i(t-1)}$	–0.167	–0.193[c]
	(0.127)	(0.167)
$DIRRISK_{i(t-1)}$	0.081	0.311[a]
	(0.138)	(0.120)
$GENRRISK_{i(t-1)}$	0.038	–0.016
	(0.174)	(0.162)
$LOGCOST_{it}$		–29.781[a]
		(4.032)
$RATING_{it}$		17.429[a]
		(2.711)
PDI_{it}		1.274[b]
		(0.520)
$TREND_{it}$		–7.042[b]
		(3.090)
R^2	0.260	0.482
n	225	225

[a] Significant at the 1% level.
[b] Significant at the 5% level.
[c] Significant at the 10% level.

interactions between the various inputs into film production, and its inclusion allows for the evaluation of the marginal impacts of some of the specific inputs (star, director, genre), over and above their composite impact. This variable is denoted by $RATING_{it}$.[22]

The final two control variables are included to capture the time-series dimension of the data set. The first is an index of Real Personal Disposable Income, for each year, and is included to account for the exogenous economic influences on film *RC*s. This variable is denoted by PDI_{it}. The final variable is a simple time trend variable, included to capture any secular trend in film *RC*s. This variable is denoted by $TREND_{it}$.

Thus all the control variables included in Equation (8) are significant, with expected signs in the cases of $LOGCOST_{it}$, $RATING_{it}$ and PDI_{it}. The negative coefficient on $TREND_{it}$ implies a secular decline in film *RC*s, which might be explained in terms of the increasingly competitive film production environment that evolved during the 1930s. In terms of the original variables from Equation (7), previous actor *RC* performance remains significant, but director *RC* performance is now insignificant. Equation (8) now also implies that there may have been some return to use of risky directors, but that the use of risky actors may have mildly inhibited *RC* performance.

While these results are of some interest, the highly aggregated nature of the regressions – aggregated over all films and time periods – may have aggregated out a number of underlying influences. One possibility is that there were differential impacts according to the budget category of the film, in the sense, for example, that the production of high budget films demanded a very different strategic approach to that of low budget films.

In order to examine this issue the films in the sample were allocated to one of three budget categories – high budget, medium budget and low budget. These three categories could be interpreted broadly as "super A", "A" and "B" movies. In order to allocate a film to one of these categories it did not seem appropriate to use some absolute cost criterion as a basis for doing so – the cost of a high budget film in the early 1930s was presumably very different from the cost of a high budget film in the late 1930s. The approach taken was to define the budgetary category of a given film on the basis of the relative average cost measure used in Table II. That is, in any given year the cost of film i was expressed relative to the average cost of all films produced in that year (and multiplied by 100). This relative average cost index was then used to allocate films to a budget category. Specifically, high budget films were defined as those films for which the value of this index was 150 or more – that is, high budget films (in year t) were defined as films whose production costs exceeded average production costs (in year t) by 50 per cent or more. Medium budget films were those films with a relative average cost index lying between 75 and 150. Low budget films were defined as those films with a relative average cost index of less than 75. While there is an element of arbitrariness in such a partition – and in part its definition was conditioned by sample size requirements within each

category, particularly the high-budget category – it at least provides some basis for disaggregating by budgetary category.[23]

Table V presents the profitability regressions for the high budget films, and Table VI presents the results for the combination of all the medium and low budget films.[24] The most obvious feature of the regressions in Table V is how little explanatory power they produce. In particular, there is no evidence of any returns to the employment of successful or emerging actors. A further variable is added to these regressions which attempts to capture the possible interaction between actors and directors, and is simply the product of the $STARRATE_{i(t-1)}$ and $DIRRATE_{i(t-1)}$ variables. This variable is denoted by $INTSTARDIR_{i(t-1)}$. The variable appears as weakly significant only in Equation (12), and note from Equation (12) that the employment of previously successful actors now has a weakly significant and *negative* impact on film *RC*. From Table V there is some evidence of returns to the use of risky directors and genres, but this hardly amounts to a well-defined strategy, and is presumably more a reflection of the uncertainty and risks inherent is high budget production. Presumably, the production of successful high budget films was more complex than such a relatively simple strategy would imply, or that the process was simply dominated by uncertainty, and not susceptible to effective risk-minimising strategies. Such a conclusion is also consistent with the results in Table II, which emphasised the poor rate of return performance of high profile actors.

By contrast, the regressions in Table VI produce much more coherent results. There were clear returns to the use of high rate of return actors and directors, and popular actors, directors and genres. There were some differences between the production of medium and low budget films. Thus the use of previously successful directors was only significant in the production of medium budget films. The use of risky stars had a negative impact on the production of low budget films, and the use of risky genres had a negative impact on the production of medium budget films.

Thus, the results in Tables V and VI can now be used to interpret the aggregate results in Table IV. It is clear that the results in Table IV are dominated by the medium and low budget films. The high budget regressions in Table V reflect the volatile nature of high budget production. There did not appear to be an obvious, or consistent, strategy available for producing profitable high budget films, save that there appear to have been some returns to risk taking. This does not define a strategy as such, but rather was an *ex post* outcome of what was presumably a series of "hit or miss" strategies that the use of unpredictable directors and genres entailed. The negligible impact that the use of high rate of return stars had is probably to be explained by the high costs of using such stars, and therefore the high profitability that such films required in order to cover these costs, profitability levels which in general were presumably not attained. The medium and low budget regressions in Table VI, on the other hand, reflect a much more ordered and predictable film production environment. There were clear returns to using successful and potentially successful stars, directors and genres, there being a disincentive to engage in risk taking strategies with regard to the deployment of actors and directors.

Table V. Regressions for film *LOG RC*s, high budget films

Independent variables	Equation (9) Coefficient (Standard error)	Equation (10) Coefficient (Standard error)	Equation (11) Coefficient (Standard error)	Equation (12) Coefficient (Standard error)
CONSTANT	397.000[a] (32.266)	503.940[a] (118.420)	427.330[c] (235.270)	471.530[b] (226.860)
$STARRC_{i(t-1)}$	0.101 (0.090)	–0.221 (0.355)	0.000 (0.094)	–0.664[c] (0.369)
$DIRRC_{i(t-1)}$	0.167 (0.155)	–0.231 (0.451)	0.141 (0.151)	–0.666 (0.458)
$INTSTARDIR_{i(t-1)}$		1.399 (1.490)		2.795[c] (1.505)
$GENRRC_{i(t-1)}$	0.014 (0.100)	0.027 (0.109)	0.018 (0.094)	–0.056 (0.099)
$STARPOP_{it}$	21.805 (15.897)	23.453 (16.023)	12.328 (15.745)	16.612 (15.273)
$DIRPOP_{it}$	19.947 (15.893)	20.250 (15.926)	18.396 (16.675)	14.817 (16.105)
$GENRPOP_{it}$	29.743[c] (17.068)	26.916 (17.363)	21.379 (17.497)	19.137 (16.822)
$STARRISK_{i(t-1)}$	–0.272 (0.495)	–0.280 (0.496)	–0.255 (0.480)	–0.336 (0.463)
$DIRRISK_{i(t-1)}$	0.602 (0.361)	0.601 (0.362)	0.683[c] (0.351)	0.748[b] (0.338)
$GENRRISK_{i(t-1)}$	1.310[b] (0.601)	1.028 (0.673)	1.275[c] (0.656)	0.975 (0.650)
$LOGCOST_{it}$			–24.120 (26.466)	–12.994 (26.076)
$RATING_{it}$			17.548[b] (6.811)	17.341[b] (6.532)
PDI_{it}			1.716 (1.647)	3.254[c] (1.783)
$TREND_{it}$			–9.762 (11.686)	–19.640 (12.404)
R^2	0.484	0.499	0.607	0.651
n	42	42	42	42

[a] Significant at the 1% level.
[b] Significant at the 5% level.
[c] Significant at the 10% level.

Table VI. Regressions for film *LOG RC*s, medium and low budget films

Independent variables	Equation (13) Coefficient (White's adjusted standard error)	Equation (14) Coefficient (White's adjusted standard error)
CONSTANT	464.820[a]	503.050[a]
	(14.722)	(47.466)
$STARRC_{i(t-1)}$	0.145[a]	0.116[a]
	(0.038)	(0.034)
$DIRRC_{i(t-1)}$	0.129[a]	0.077[c]
	(0.044)	(0.043)
$GENRRC_{i(t-1)}$	0.120[a]	0.080
	(0.039)	(0.052)
$STARPOP_{it}$	23.586[a]	24.615[a]
	(5.442)	(5.384)
$DIRPOP_{it}$	20.128[a]	14.887[a]
	(4.501)	(4.179)
$GENRPOP_{it}$	14.635[b]	15.108[b]
	(6.580)	(6.176)
$STARRISK_{i(t-1)}$	–0.141	–0.194
	(0.132)	(0.118)
$DIRRISK_{i(t-1)}$	0.003	0.240[c]
	(0.138)	(0.128)
$GENRRISK_{i(t-1)}$	–0.412[b]	–0.380[b]
	(0.175)	(0.165)
$LOGCOST_{it}$		–26.940[a]
		(4.953)
$RATING_{it}$		15.384[a]
		(3.133)
PDI_{it}		1.596[b]
		(0.617)
$TREND_{it}$		–9.533[a]
		(3.580)
R^2	0.334	0.506
n	183	183

[a] Significant at the 1% level.
[b] Significant at the 5% level.
[c] Significant at the 10% level.

7. Conclusion

This paper examines Warner Bros.' approach to film production during the 1930s from a strategic perspective, and places an emphasis on financial rather than artistic strategies. As such it only purports to provide a partial analysis of the film production process, and can perhaps best be interpreted as providing an analysis of the financial context within which the more intractable artistic decisions had to be to taken.

Evidence is presented of Warners adopting an incremental approach to the development of their film portfolios, building on the success of their actors, directors and genres, with such an approach appearing to have a positive impact on film *RC* performance.

However, when a distinction is drawn between high budget and medium/low budget film production, these positive effects that could be attributed to the exploitation of stardom were seen to have been derived exclusively from the production of medium/low budget films. In particular, the use of stars did not appear to have been an effective strategy in the production of high budget films. In part, this could be explained by the fact that the production of high budget films was necessarily risky and represented a major focus for innovation. Thus some evidence is presented of returns to risk taking behaviour in the production of high budget films, but of negligible returns to an incremental approach. Perhaps this is to be expected, given the one-off nature of much high budget production – the production of a high budget "hit" is a complex process and the relatively simple strategy of using high profile stars to carry such productions is unlikely to have been successful of itself. In addition, Warners' expertise lay in the production of medium to high/medium budget films.

The conclusion which emerges is that the financial data on the performance of films produced by Warners during the 1930s indicate that studio investment in "stars" and "big budget" vehicles in which they appeared is not explained by standard investment criteria: the additional expenditure on star qualities and expenditures associated with "big budget" films did not consistently generate sufficient box-office revenues to justify this investment. Accordingly, the production of big budget productions should be seen not as a business decision governed by a calculus based upon a probability distribution of risks, but rather as stand alone investments, akin to product innovation, in which the producer's imagination is paramount. Nevertheless, and this is critical, such investments were made in a context of a portfolio of film products which in effect cushioned the gamble in this type of film.

Finally, to focus on particular stars and to evaluate their contribution to the profitability of specific films may be potentially misleading. The analysis here has demonstrated that there are clear returns to the use of previously successful actors, and particularly so in the production of medium/low budget films. That such a strategy must necessarily produce "stars" is self-evident. However, to observe

that some well-established stars did not have a significant impact on the financial success of the films in which they appear is not necessarily a rejection of value of stardom. Rather it may reflect the natural cyclical nature of stardom, in that it is inevitable that stars lose their star power, and therefore at some point cease to produce value added. Additionally, film production must also be seen within its institutional context, in the sense that any film is but a component of a portfolio of films. It is the manner in which risk is spread across this portfolio that is of relevance, and in turn, how the deployment of actors, amongst a range of strategies, can be used to attenuate this risk.

Notes

1. *Variety* publishes data relating to the top 60 grossing films on a week by week basis, data that are collected and supplied by A. C. Nielsen/Entertainment Data International. These data also appear in a variety of other published sources, electronic and otherwise.
2. A. C. Nielson/EDI.
3. See Bart (1999) for a well known film analyst's conception and description of the risk environment facing production companies.
4. This process was accentuated as a consequence of the dramatic decline in real box-office revenues between 1946 and 1963, encouraging studios to off-load their stars in an effort to cut back on overhead costs. The widespread adoption of the net profit contract can be viewed as a means of transferring risk from the production company to the star. See Weinstein (1998), and Acheson and Maule (1994).
5. The data set is derived from the recently discovered William Schaefer ledger of production costs and box-office returns of feature films released by Warners between 1922 and 1951. The authors are grateful to Mark Glancy for access to the complete Schaefer ledger.
6. We are grateful to Richard Jewell (RKO data) and Mark Glancy (MGM data) for kindly making these data sets available to us – see Jewell (1994) and Glancy (1992).
7. See King (1986).
8. This can be justified in terms of identifying those actors whose performances were of overall importance to the studio. However, the string of actors who appeared in each of the 441 films released during the period, have not been weighted according to their billing status.
9. Weinstein (1998) confirms the generality of such contracts during the studio period. For a general discussion of stardom during these years, see Sedgwick (2000, ch. 9). Balio (1995, pp. 155–161) gives an account of the typical life cycle of stars and details James Cagney's and Bette Davis' respective disputes with Warners during the mid-1930s. Also see Klein and Leffler (1981) on the economics of breaking contracts.
10. Where the star was on "picture-deal" terms the studio would cast the star in low-budget productions to encourage the star's agent to negotiate "buying out" the contract, e.g., Joan Crawford paid $200,000 in 1952 to be released from her contract with Warners. Where the contract had clauses giving the star approval of script and/or director and/or co-star and/or cinematographer and/or working conditions, the studio simply produced a flow of proposals that would be unacceptable to the star in the hope of forcing a buy-out (see Shipman, 1989, pp. 130–136).
11. See Sedgwick, op. cit., for a discussion of loan outs. See also Balio (1995, pp. 155–166) for a discussion of the life cycle of stars.
12. See Equation (6) in Sedgwick and Pokorny (1998).
13. This variable is imperfect as a strict and independent measure of expectations. To the extent to which box-office revenues increase with production budgets (albeit in a highly heteroscedastic manner), the share of production budgets allocated to actor i will tend to increase if the actor

appears in higher budget films in period t, as compared to $t - 1$, *cet. par*. This in turn will tend to produce higher average revenues in t. Thus the significance of this variable will tend to be overstated.

14. Throughout risk is measured in terms of the coefficient of variation rather than the standard deviation, on the assumption that it is a relative measure rather than an absolute measure that is appropriate. However, using the standard deviation results in only marginal and generally insignificant changes.
15. Annual cinema admissions fell from 4,576 million in 1936 and 1937 to 4,420 million in 1938 in response to a fall in real personal disposable income in the U.S. from $84.9 to $79.6 billion between 1937 and 1938 (Historical Statistics of the U.S. (1975), found in Table 1 in Sedgwick and Pokorny (1998). The decline in profitability was marked since the studio had substantially increased the average budgets of its films.
16. A few films, such as *A Midsumer Night's Dream* (1935), and the all black musical, *The Green Pastures* (1936), appear to have been made primarily to boost the cultural kudos and "respectability" of the studio.
17. These films were for the greater part B features that were intended to play a supporting role to main features on cinema programmes.
18. There were a number of films in which observations were unavailable on either the first or second star, as a result of either star not having appeared in any films in the previous season. In such cases the observation on the single star was used. There were 90 films (out of the 225 for which a full set of observations was available – see Endnote 19) which contained a 'missing' observation for either the first or second named actor – 23 missing observations on the first named actor and 67 on the second named actor. There were a variety of reasons for the non-appearance of actors in the previous season. In some cases films included actors who only ever appeared in 1 or 2 films over the sample period. Some of these would have been loaned out by rival studios. New actors by definition would not have appeared previously, and these were a mixture of genuinely unknown actors, and well-known actors transferring from other studios. In a small number of cases actors skipped a season. There was a small number of films in which only one actor was recorded in the original ledgers. Using just the *RC* value of the just first named actor, resulted in no substantive changes to the regression results, although resulted in a toss of 23 observations. Imputing a zero value for missing observations resulting from the use of unknown actors again produced no substantive changes in the regression results. The same approach was used for the popularity and risk variables.
19. Due to the one-year lag in the regressions all observations for the first year of the sample period – 1931/2 – were lost. Observations were also lost for films in which the first and second named actor did not appear in the previous season, or the film's director did not direct a film in the previous season, or the film's genre did not occur in the previous season. Observations were also lost for actors, directors and genres who did not generate multiple observations in the previous year to enable the calculation of coefficients of variation.
20. According to the Breusch–Pagan (Koenker adjusted) test. The regression disturbances were normal according to the Bera/Jarque test, and all subsequent regressions also satisfied this test.
21. See Nash and Ross (eds.) (1985).
22. Like Hamlen (1991, 1994) we use an external quality measure. Unlike him, our quality variable represents the finished product (in our case the film) whilst his is a measure of the quality of the input (in his case the quality of the voice). Whereas Hamlen is concerned to investigate whether popular music singers conform to Rosen's conception of superstardom, where the more talented will take a larger share of the market over time, our investigation is focused on the contribution made by the star to the returns generated by the film outputs of the studio.
23. A number of alternative partitions were used. For example, the high budget films in each year were also defined as the 20% most expensive films in the year, medium budget as the next 40% most expensive films, and low budget as the remaining 40% of films. Marginal changes to the

relative average cost index cut off points were also experimented with. These different partitions did not produce significant changes in the statistical results that follow.

24. The high budget regressions did not indicate the presence of heteroscedastic disturbances, and so conventionally calculated standard errors are quoted. Re-estimating the equations using White's adjusted standard errors produced similar results.

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