THE EFFECT OF A TECHNOLOGY SHOCK ON CONTRACT FORM: REVENUE-SHARING IN MOVIE EXHIBITION AND THE COMING OF SOUND

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ABSTRACT: During the silent era, movie producers rented the vast majority of their films to exhibitors for flat per-day fees, but a technology "shock" in the form of the coming of sound led to the widespread replacement of flat fees by revenue-sharing. This paper seeks to determine why. It finds that sound technology altered the structure of incentives in movie exhibition, reducing the role of the exhibitor (which decreased concern about exhibitor shirking), reducing the cost of dividing attendance revenue ex post (necessary for revenue-sharing), and increasing the uncertainty over film values (at least initially), thus raising the cost of negotiating a mutually acceptable (to producer and exhibitor) lump sum payment. These findings allow additional light to be shed on the reasons for share contracts in general—most previous studies have been limited to an examination a cross-section of contracts.

I. INTRODUCTION

At least since Adam Smith, economists have been intrigued by share contracts. There has been a proliferation of models, most of which tend to explain the share contract as resulting from some mix of optimal risk-bearing and optimal effort motivation.[1] A large number of researchers have attempted to test these models empirically. Sharecropping contracts, not surprisingly, are the most intensively examined (see the bibliography in Knoeber 1999), but similar studies have been conducted in many other areas. For example, Martin (1988) and Lafontaine (1992) examine franchise arrangements, Hallagan (1978) investigates contracts used to lease gold claims, Leffler and Rucker (1991) analyze a sample of private timber sale contracts, Aggarwal and Samwick (1999) investigate incentive contracts between firms and their executives, and Chisholm (1997) and Weinstein (1998) examine profit-sharing contracts between movie stars and movie producers.

Most empirical studies examine a cross section of contracts in attempt to determine how (or whether) they differ according to the attributes of either contracting party or product. This paper instead investigates an area where a sudden technology shock led to the rapid and wide-spread re-

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[1] See, for example, such review articles as Prendergast (1999) and Sappington (1991).

placement of one form of contracting by another. The industry is the motion picture business, and the shock was the arrival of sound. During the silent era, the vast majority of cinemas rented their films from movie producers for flat, daily payments. Within two years of the release of the first sound picture, revenue-sharing contracts between producers and exhibitors were the norm, and remain the norm until this day.[2] Investigating why this seemingly straightforward evolution in the nature of the product (from silent to sound) should have brought about such a fundamental alteration in pricing allows me to shed light on the factors that explain share contracts in general. By focusing on how incentives changed with the coming of sound, and then relating those changes to the predictions of the theoretical models, I can conduct a very different type of investigation than has been undertaken before.

What I find is the following: First, from a moral hazard perspective, the advantage of flat rental payments by film exhibitors is that they make the exhibitor the residual claimant, and thus ensure the optimal provision of the exhibitor's inputs without the expense of monitoring. But the coming of sound substantially altered the nature of those inputs—live music and other acts, supplied by the exhibitor, were replaced by short sound films, supplied by the producer. Concern about exhibitor shirking fell correspondingly, and so did the need for flat rental payments. Second, the early sound films brought with them new techniques in cinematography and plotting, and a new and untested roster of stars. As a result, audience response was very difficult to predict, which rendered the revenue-generating potential of the early sound films substantially more uncertain than that of silent films had been. However, it appears that concerns about *risk-bearing* were nonetheless not a major influence on contract choice—flat fees continued to be used for the smallest (and thus plausibly most risk averse) independent cinemas, while the substantially larger chains rented their films on a revenue sharing basis. Instead, it seems that the increase in uncertainty was significant principally in that it raised the cost of negotiating a mutually acceptable flat fee. As Barzel (1982) points out, when the cost of measuring the quality of a product rises, share contracts become an attractive alternative to

[2] Revenue sharing was used in certain rare circumstances during the silent era, and flat fees continued to be used in some cases during the sound era—see section IV.B and IV.C for details. However, the vast majority of contracts involved flat fees during the silent era and revenue-sharing during the sound era.

lump sum payments—they reduce the incentive for purchasers to expend efforts on measurement because the gain from having a high quality unit versus a low quality unit is reduced versus a lump sum fee. Finally, average revenue per film increased with the coming of sound, while the cost of ensuring that the exhibitor reported attendance revenue honestly—done by locating a producer's representative in the theater—remained the same. The ex post division of revenue thus became cheaper on a per-film basis, and a share contract more attractive.

The paper proceeds as follows: Section II discusses the nature of the problem faced by producer and exhibitor and the factors predicted to influence the choice of contract form. Section III reviews the coming of sound and the change in exhibition contracts that accompanied it. Section IV examines the evidence on how sound altered film exhibition, and discusses several instances in which revenue sharing was used during the silent era and flat fees were used during the sound era. Section V discusses the implications of that evidence for the factors predicted to affect the choice of contract. Section VI concludes.

II. THE NATURE OF THE PROBLEM

A movie producer contracts with a movie exhibitor so that they may jointly produce the final good: a movie presentation. To that end, each supplies essential inputs. The producer provides the movie (itself assembled from a variety of inputs) and some sort of national advertising support. The exhibitor provides the theater (which consists of seating, projection equipment, a refreshment stand, support activities, and so forth) and some form of local advertising. The output from this joint activity is attendance revenue: a certain number of consumers will pay the given price to view the film.

As researchers have pointed out (see, e.g., DeVany and Walls 1996) attendance revenue is highly uncertain, even for a given quantity or quality of inputs. Because the same price tends to be charged for all films (although it may vary across cinemas, times of day, and customer types), the uncertainty involves the number of people who will choose to attend at the given price.[3] Attendance

[3] All uncertainty is thus on the demand side, in contrast to agricultural share contracts, which must account for major uncertainty in factors affecting supply (weather, for example).

revenue is therefore equal to:

$$AR = p*A(p, inputs_p, inputs_e, \theta)$$

where p is the ticket price and A is attendance, which is a function of ticket price (p), producer and exhibitor inputs ($inputs_i$), and a random variable θ, which reflects uncertain consumer response.

The movie producer retains ownership of the film, and rents it to the exhibitor for a specified period of time. Consider the following form of payment:

$$y = \alpha + \beta*AR$$

where y is the net revenue received by the producer. A range of contract types is possible. The exhibitor could simply make a flat payment for each day it showed the film, in which case $\alpha > 0$ and $\beta = 0$. Or the producer could instead hire the exhibitor to show the film, in which case $\alpha < 0$ and $\beta = 1$. Or the two parties could enter into an arrangement to share the attendance revenue, by which $\beta > 0$. In a world of perfect certainty, contracting parties would be indifferent between these alternatives, but the real-world unpredictability of attendance revenue (θ) renders the choice of contract form meaningful. As noted in the introduction, there is a substantial literature that seeks to explain the circumstances under which share contracts will be used. I will focus on four factors. The first two have been central to most studies of share contracting: moral hazard and risk aversion. The second two have received important, but more limited attention: the cost of pre-sale measurement, and the cost of dividing output ex post.

1. Moral Hazard

Moral hazard models typically assume that a principal employs an agent to undertake a task, but that neither principal nor agent is able to observe the precise behavior of the other, nor infer it from the level of output, because output has a stochastic element. One-sided moral hazard models (e.g., Holmstrom and Milgrom 1987) emphasize shirking by the agent and focus on the choice between optimal effort-motivation and optimal risk-bearing. Two-sided moral hazard models (see e.g., Reid 1977, Eswaran and Kotwal 1985, and Allen and Lueck 1992) emphasize shirking by both parties, and typically assume that the contracting parties are risk neutral.

In the context of film exhibition, the movie producer (principal) enters into a contract with the exhibitor (agent) to reap gains from specialization—the exhibitor is better informed as to the appropriate level of local inputs. However, the assignment of residual claims creates incentive problems; for example, the exhibitor may choose to provide less than the efficient amount of local inputs if it keeps less than the full amount of the corresponding gain. Because of the inherent unpredictability of attendance revenue, determining whether or not the exhibitor has shirked in completing its duties is difficult. One way to ensure the efficient provision of the exhibitor's inputs without monitoring is for the producer to simply "sell" the movie to the exhibitor—i.e., to rent it for a flat fee. Of course, the producer also provides necessary inputs, and may also be inclined to shirk; for example, to provide lower-than-optimal quality films, or less-than the optimal amount of national advertising. Exhibitor shirking is most likely if it sells its services for a flat fee and is least likely if it pays a flat rental for the film instead, and producer shirking is most likely if the producer receives a flat fee for its film and is least likely if it pays the exhibitor a flat fee instead. From the starting point of a flat fee rental payment by the exhibitor ($\beta=0$), the models suggest that as the importance of the exhibitor's inputs declines relative to those of the producer, a share contract ($\beta>0$) becomes a more attractive option.

2. Risk Aversion

The one-sided moral hazard model (Holmstrom and Milgrom 1987) attributes the choice of contract form to a trade-off between efficient effort-motivation and efficient risk-bearing. A flat fee rental paid by the exhibitor ($\beta = 0$) requires that the exhibitor bear all the risk of the uncertain attendance revenue. If the exhibitor is risk averse, it will have to be compensated accordingly, most likely in the form of a lower per-film price. By replacing the flat fee with a share contract ($\beta > 0$), the producer can bear some of that risk itself, and thus receive a higher per-film price.[4] If the starting point is a flat fee rental payment by the exhibitor ($\beta=0$), the riskier the film (i.e., the more uncertain audience response), the greater the compensation the exhibitor will require, and thus the more attractive a

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[4] At the extreme, the producer could set $\beta = 1$ and $\alpha < 0$—i.e, could simply pay the exhibitor to show the film—thus taking all risk upon itself. Of course, there might be a corresponding cost in terms of exhibitor effort.

share contract (β>0) becomes.

3. Pre-sale Measurement Costs

Heterogenous products (such as movies) generally inspire efforts by buyers to measure the quality of the good before purchasing it. For many goods, such efforts are socially valuable, as they reward the most efficient producers and punish the least efficient. However, when the characteristics of the good are not affected by the amount of buyer measurement (for example, a movie does not garner a larger audience just because exhibitors have expended efforts on predicting audience response) and buyers have equal valuations for the product, pre-sale measurement is socially wasteful. As Barzel (1982) points out, this gives sellers the incentive to take actions to minimize the cost of pre-sale measurement; for example, by making public the seller's own information on the attributes of the good, or by taking action to reduce the cost to buyers of amassing that information themselves.[5] However, when the value of a product is very difficult to determine at the time of sale no matter what actions the seller takes, the seller may seek to reduce the amount of pre-sale measurement instead, by entering into a share contract. Buyers who provide payment in the form of a proportion of the output have less incentive to expend resources measuring product quality ex ante—they lose less if the product is low quality and gain less if it is high quality. From the starting point of a flat fee rental payment by the exhibitor (β=0), as the cost of pre-sale measurement rises, a share contract (β>0) becomes relatively more attractive.

4. The Cost of Dividing Output Ex Post

Share contracts require the parties to divide ex post an output that is uncertain ex ante. For example, a revenue-sharing contract between movie producer and movie exhibitor requires that they divide attendance revenue after the showing of the film has been completed. However, only the exhibitor observes actual attendance in the course of performing its duties. And because this revenue is unpredictable, the producer can not easily determine whether what the exhibitor has reported honestly. Ensuring the honest reporting of output so as to permit sharing has been shown to be quite

[5] Leffler and Rucker (1991, 1065) point out that sellers of timber allotments will cut roads, provide aerial photographs, supply detailed area-specific cruises, and so forth.

estly. Ensuring the honest reporting of output so as to permit sharing has been shown to be quite costly in many settings—see, for example, Allen and Lueck (1992), Lazear (1986), and Umbeck (1977). Flat fee rentals ($\beta = 0$) eliminate the need for any ex post division of output, and thus will be most attractive when that division is very costly. From the starting point of a flat fee rental payment by the exhibitor (β=0), as the cost of dividing output falls, a share contract (β>0) becomes relatively more attractive.

In sum, this section's discussion has highlighted several factors that might explain the widespread replacement of flat fees by revenue-sharing ($\beta = 0$ to $\beta > 0$) in movie exhibition contracts that accompanied the coming of sound. In what follows, I will seek evidence as to the relative importance of these factors. If concern about exhibitor shirking diminished following the coming of sound, that would suggest the importance of moral hazard concerns to the choice of contract form. If attendance revenue became riskier and revenue sharing was used most intensively for the most plausibly risk averse cinemas, that would suggest that concerns about optimal risk-bearing were a significant influence on contract choice. If it became more difficult post-sound to negotiate lump sum fees, that would suggest that pre-sale measurement costs were a significant influence on contract choice. Finally, if the cost of dividing attendance revenue ex post declined with the coming of sound, that would suggest the importance of that factor.

III. BACKGROUND

In this section, I will briefly review the coming of sound and the change in exhibition contracts that accompanied it.[6]

A. The Coming of Sound

The potential for the simultaneous projection of pictures and sound existed nearly from the dawn of motion pictures—Thomas Edison is credited with inventing both the movie projector and

[6] Most other aspects of the exhibition contract were unchanged by the coming of sound, as was the structure of the distribution system itself. For a discussion of that system, see Hanssen (2000) or De Vany and Eckert (1991).

the phonograph in the late 19th century, and he experimented with linking them.[7] However, it was not until the mid-1920s that technology had developed sufficiently to allow sound to be recorded on the same strip of film as pictures, which was necessary for the systematic synchronization of the two. The first public showing of a "sound" feature film occurred in 1926, when a previously-released silent movie, *Don Juan*, was fitted with synchronized music. But the dawn of the sound era is generally considered to coincide with the release of *The Jazz Singer* by Warner Brothers in late 1927. *The Jazz Singer* actually contains only three short sound sequences, each a song by its star, Al Jolson, accompanied by a bit of dialogue. Like many of the very early sound features, it had been conceived as a silent film; a sound track was added later in the production process. It was extremely popular, earning $2 million through 1931 (Crafton 1997, 111), and made clear the appeal of sound motion pictures.

It is important to recognize that silent and sound films are different goods—a sound film (of the type we see today or even saw in 1930) is not simply a silent film plus talking and music. Silent plots were, by necessity, much simpler than sound plots; the lack of dialogue meant that very complicated ideas and plot twists could not be communicated. The cinematography was also different—wide-lensed views of the action alternated with tight closeups on the faces of the actors. The gestures and facial expressions that actors used were highly stylized—broad, sweeping movements and widening or narrowing of the eyes would indicate anger, anguish, happiness, and so forth in ways that were recognized by contemporary audiences, but are far removed from how people actually behave (which is essentially what sound films show).[8] As we will see, the transition to sound cost many actors their careers, because the skills necessary for stardom changed fundamentally.

Despite the success of *The Jazz Singer* and several other early sound films, many industry

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[7] See Crafton (1997, 9). It would be more accurate to say that Edison's work was the culmination of a number of incremental developments dating back to the "magic lantern" of the mid-17th century (it projected drawings on a screen). See Beaver (1983) for one of many histories of the cinema.

[8] Silent films look very strange to contemporary viewers for exactly that reason. Witness the following comment by a film critic on Marion Davies' performance in the 1920 silent film *The Restless Sex*, "Not only does she display a much greater sense of repose before the camera, but her facial expressions reveal a care, clarity of purpose and conviction that are striking." (*WID's Yearbook*, 1920-1921, 308).

pundits initially regarded sound as a fad, and even supporters expected talking and silent films to co-exist indefinitely.[9] It was soon clear that both were wrong. Warner Brothers released the fifty percent talking feature *The Lion and the Mouse* in May of 1928 (*The Jazz Singer* had been less than ten percent talking), and the first fully talking picture, *The Lights of New York* (based on a Broadway play), the following July. The company reported a $2 million profit for the fiscal year ending August 1928 after years of poor performance, and announced that all its films planned for the 1928-29 season would have sound (Crafton 1997, 113). United Artists made the same announcement in November of 1928 (*Variety*, November 7, 1928, page 11), and Fox declared in March 1929 that it had made its last silent feature (Crafton 1997, 201). Of the 200 films released in the last quarter of the 1928-29 season, 86 were "100 percent talking," and fewer than 20 were purely silent.[10] *Film Daily Yearbook*, in its synopsis of 1928, wrote, "July was proving a heyday for the wired houses, and, conversely, the unwired ones were fighting with their backs to the wall." By the end of 1929, most cinemas in the largest cities had been wired for sound, and by 1930, Hollywood had largely stopped producing silent films.

Table 1 lists the number of films made, attendance, and box office receipts for the years for which data are available from the silent era to 1940. As column 1 shows the coming of sound (in 1927-28) was accompanied by a reduction in the number of films made. Although systematic cost data are not available, Lewis (1933, 127-8) estimates that the average per-film production cost rose by twenty-five percent after sound, while Crafton (1997, 183) reports that it cost 22.5 percent more

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[9] Jack Warner, the champion of the talking picture, said as late as 1928 that he expected most future films to be part sound and part silent (Crafton 1997, 174). Adolph Zukor, President of Paramount Pictures, was also quoted in late 1928 as saying, "By no means is the silent picture gone or even diminished in importance. . . . there always have been subjects which could not be augmented in value or strength by the addition of sound and dialogue." (*The Film Daily 1929 Yearbook*, 513). The author of a case study of a cinema considering the conversion to sound in 1928 writes, "It was difficult to judge the permanence of the appeal of sound pictures. Theatrical managers were convinced that the appeal at first was largely one of curiosity." ("Clayton Theater" 1928, 491)

[10] Crafton (1997, 171). A silent film version of the story of the sinking of the Titanic was abandoned in the summer of 1928 with the following explanation: "Until assured of a more popular market for an all-silent picture that will warrant the money it will cost . . ." (*Variety* August 1, 1928, page 4). Several months later, a *Variety* article began with the following sentence, "With talkers now looked upon as the mainspring of the trade . . ." (November 7, 1928, page 5). That same issue announced that thirteen of the fourteen Broadway movie houses where high profile films were given their debuts were showing sound movies that week.

to run the film business in 1929 than in 1928, largely as a result of conversion of studios to sound.[11] Column 2 of table 1 lists average weekly attendance from 1926 to 1940, while column 3 lists attendance per film. As can be seen, movie attendance increased sharply with the coming of sound (compare 1926 and 1927 to 1929 and 1930) despite the fact that the number of pictures on the market fell. And although both attendance and box office receipts then declined as the Great Depression took hold, sound films continued to attract substantially larger audiences than had silent films. Box office receipts are shown in columns five and six. The average sound film earned revenues that were more than twice in real terms those of the average silent feature.

B. The Change in Movie Contracts

> "In June 1929, prior to the opening of the motion picture selling season, it was apparent that percentage pricing would become the accepted method of sale that year. . . . In the past, practically all sales had been made on a flat rental basis." ("Shaefer Pictures Corp.", 1928, 336)

During the silent era, exhibitors nearly always paid a flat per day rental for each film they showed.[12] This system of flat prices had been the norm since the establishment of the feature film early in the second decade of the 20th century.[13] Percentage pricing was used very occasionally for the release of unusually big budget silent features (see section IV.B below), but the coming of sound quickly made it the norm. The change began with the release of *The Jazz Singer*. As Crafton (1997, 111) writes

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[11] An article in *Variety*, the trade newspaper of the motion picture business, predicted that the average cost per motion picture would rise from $150,000 in 1928 to $400,000 in 1929, due primarily to the addition of sound (November 21, 1928, page 28). "Independent Producers Sound-Barred by High Cost" says a headline in *Variety*, the trade newspaper (November 14, 1928, page 7). The text reads, "lack of sound recording equipment and the uncertainty of the sight and sound market is forcing many small independent producers on the coast to hold up production for further developments." Another *Variety* article displays the headline "Cutting Down Product; 500 Features Instead of 800." (November 21, 1928, page 28) The text reads, "Practically every company will produce less pictures, in some cases only 50 or 60% of the guaranty in previous years."

[12] Both during the silent and sound eras, film prices were negotiable, with the rental fee varying with the size of the cinema, the size of the town, the expected performance of the film, and other such factors;. see, e.g., "Federal Trade Commission" (1923-28, 228) and Franklin (1927, 27).

[13] Feature films are the one-two hour productions that we are familiar with today. Before they appeared circa 1912, the standard program consisted of a series of short films that were sold outright. See Hanssen (2000) for a brief history

> Instead of the traditional flat rental fee, Warner's took a percentage of the gate. The signing of the contract by the greater New York Fox circuit was regarded as a headline making precedent. The silent practice of renting for a flat fee was eventually replaced by this new percentage-of-the-gross pricing.

Various forms of the share contract emerged. The form most favored by exhibitors was a straight split of revenue, typically with 60 percent going to exhibitor (who had to meet the various overhead costs) and 40 percent going to the producer (Lewis, 1933, 191-2). Also common, particularly in the early days, was a guarantee plus a split. The exhibitor would promise a minimum payment to the producer (often equal to the average silent film rental), and all revenue above a specified amount (equal to average revenue on similar movies in some cases) would be shared (see "Willard Theater" 1928, 592). Finally, some contracts called for the sharing of all revenue beyond an allowance for exhibitor expenses. The sharing percentages were negotiated, but would range from 50 to 60 percent for the distributor. This last form of contract is the most commonly used today, although the percentage going to the producer now declines with run length: 60 percent for the first week, 50 percent for the second, and so forth.[14]

IV. THE EVIDENCE

A. How Movie Exhibitions were Changed by the Coming of Sound

During the silent era, the "show" consisted of much more than the movie, also including a number of live performances of various types. For example, urban houses booked major vaudeville acts, and even the smallest and most rural theaters offered such things as "wooden shoe" dances, or "beautiful baby contests."[15] These acts were organized and/or booked by the exhibitor with little or no participation by the producer. In addition, the exhibitor had to ensure proper musical accompaniment to the film. A small, neighborhood theater would have had at least a piano player on its payroll, while large metropolitan houses employed their own orchestras.[16] House musicians were required to

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[14] See, e.g., De Vany and Eckert (1991, 67).

[15] See *The 1925 Film Daily Yearbook*'s "The Manual of Exploitation," pages 677-678 (that special section was intended to help exhibitors to design their own live shows).

[16] The results of a 1922 survey indicated that 29 percent of respondents employed a full orchestra (the median

learn and play a new musical set whenever the program changed, which could be as often as three times per week. Organizing the musicians, and even choosing the music, was usually left entirely to the exhibitor.[17]

Live acts and music were not just a pleasant accompaniment to the film—accounts of the time indicate that they were considered at least, and perhaps more, important. For example, Koszarski (1990, 53) describes a series of reports presented at the 1925 annual meeting of the Society of Motion Picture Engineers (i.e., exhibitors), "What is most interesting about these reports is the emphasis placed on the composition of the show, and the theater's treatment of its films as just another troublesome item on the bill." Audiences evidently agreed; when a 1924 pollster asked film customers what aspects of a cinema appealed to them most, twenty-eight percent cited the music, nineteen percent the courtesy of the staff, eighteen percent the comfort of the interior, fifteen percent the attractiveness of the theater, and only ten percent mentioned the films (Koszarski 1990, 30). And twenty-four percent of exhibitors surveyed in 1922 said that the quality of the feature film "made absolutely no difference" to success at the box office; what mattered, they said, was the surrounding program (Koszarski 1990, 9). Advertisements of the time (see, for example, Koszarski 1990, 42; 49) tended to give as much print to the music and the live acts as they did to the title, actors, or plot of the feature film.

The coming of sound quickly eliminated live performances. First, sound features had their own musical tracks, and so required no live accompaniment. In addition, it was cheaper and easier to

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size being five pieces), 50 percent had an organ and organist, and 21 percent had only a piano. See Koszarski (1990, 41). Large theaters invested substantially in their orchestras; for example, Publix Theaters, belonging to Paramount, boasted in 1928 that they were "the largest employer of stage talent of any circuit in the world." Their payroll included 1000 chorus girls, 250 dancers, 34 blues singers, 51 opera singers, 25 comedy singers, 50 comedians, and 1200 musicians (*Variety*, April 25, 1928, page 1). Franklin (1927, 47) notes that many first and second-run American cinemas spent in excess of $200,000 per year on musician salaries alone.

[17] It was rare that a picture would have its own specially-written score; instead, stock pieces were chosen to conjure up particular moods. The producers would occasionally include a folder of such pieces with their shipment of the film, but more common was the "cue sheet," which provided a short description and the approximate length of the film's various scenes, so that the theater's music director (or piano player) could prepare the musical accompaniment on his or her own. Large orchestras maintained huge music libraries, and even the single pianist had access to such volumes as *Motion Picture Moods* (see Koszarski 1990, 43).

present a short film of an orchestra or musical act than it was to show it in person. The June 6, 1928 edition of *Variety* proclaimed with a banner headline, "Stage Bands Passing." Two months later, the fabulous Roxy Cinema in New York City announced that it was phasing out live shows, and would instead emphasize sound films (*Variety*, August 8, 1928, page 48). Two months after that, a headline announced of Grumman's famous Chinese Theater in Hollywood, "Grumman's Abandons Pit Orchestra and Stage Shows—All Sound at Chinese" (*Variety*, October 31, 1928, page 23). By the end of 1929, live acts and music were to be seen only at specialty houses.

Sound changed the technical duties of the exhibitor, as well, but in ways that both expanded and contracted the role of the exhibitor. For example, during the silent era, exhibitor editing of film and variations in projector speed (to keep the film in line with the evening's schedule) were the norm; the coming of sound rendered both impossible. At the same time, sound increased the duties of the exhibitor in other ways. The projectionist had always been responsible for the maintenance of the projector, but now he had to learn the mechanics of sound as well. In addition, there were initially gaps in the recording technology that exhibitors were expected to correct for in the theater.[18]

Nothing changed as dramatically for producers as for exhibitors. Film making was altered in some ways by the introduction of sound; for example, large soundproof studios had to be constructed and the roster of actors changed (see the next section). But the process of shooting, distributing, and marketing motion pictures was largely unaffected. Sound films were more costly to produce, on average, but also garnered higher revenues, on average (see table 1). However, as a result of the disappearance of the live act, the quality of the film itself became relatively more important. Post-sound, patrons came to the theater for only one reason: to watch the films.

B. Audience Response to Early Sound Films

Crafton (1997, 166) writes, "Sound epitomized what businessmen hate most: uncertainty."[19] To begin with, no one was even sure what a sound film should look like. Should it simply synchro-

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[18] See, e.g., Franklin (1929, 61-63, 77), Koszarski (1990, 59-61), and Crafton (1997, 260-61).

[19] In fact, Crafton titles the introduction to his book on the emergence of the talking picture, "The Uncertainty of

nize music and add sound effects? Should it include dialogue? How much dialogue? Should certain types of films (dramas, for instance) include spoken dialogue, while others (comedies, for instance) remain silent? Many of the early "sound" productions in fact contained no dialogue at all (they still used title cards), but simply added synchronized music and sound effects.[20] Three ways of dealing with sound technology emerged initially: music and sound effects were added to existing silent features ("retro-fitting"), dual versions of new films were produced (both silent and sound), and films were made that were essentially silent in their nature and plotting, but had several "sound" scenes grafted on (*The Jazz Singer* is an example). By the 1929-30 season, what had been a popular novelty was being criticized for being too loud and ostentatious, and the musical, initially considered the ideal platform for sound, was flopping (Crafton 1997, 268-9).

The general sense of uncertainty was enhanced by the fundamental change sound brought about in the roster of movie stars. As DeVany and Walls (1999) point out, one of the few things that render film performance relatively more predictable is a predictably popular star. Yet with the coming of sound, the popularity of all existing stars was thrown into question. It is instructive to read movie advertisements from the 1920s and 1930s; although some of the names correspond, for the most part, one is dealing with two different sets of actors. A page one article in November 28, 1928's issue of *Variety* makes this clear. "Film Stars Fading Away," reads the gigantic headline, while the sub-headline says "Talking Films Make Big Change." Most of the big stars of the silent era—John Gilbert, Richard Barthelemess, Vilma Banky, Corinne Griffith, Colleen Moore—failed to make the transition to the talkies.[21] The skills required were fundamentally different—as noted, the silent actor communicated through facial expressions and gestures, while the sound actor used his/her voice. Studios engaged in a panicked rush to sign stage stars; at least *they* knew how to talk. Some suc-

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Sound."

[20] This led to many disappointed and unhappy patrons, and a push towards standardized labeling. A *Variety* article of June 6, 1928, page 48, suggests that a "sound" film be defined as one with sound effects but no dialogue, while a "dialog" film be one that had spoken parts, as well. The article concludes that the former were here to stay but, with respect to the latter, it was too early to tell; "They [dialog pictures] are wholly experimental at present and probably for at least a year to come."

[21] See Griffith and Mayer (1957, 247-251) for a discussion of the effect of the coming of sound on the roster of stars; in particular, see the sub-section entitled "Kaput."

ceeded, but many more failed.[22] When Lewis (1933, 121) writes that "motion pictures production underwent an almost complete revolution" with the coming of sound, he is referring to the fact that a whole new group of stars had to be developed, making the revenue-generating potential of a given sound film that much more difficult to predict.

C. The Use of Share Contracts During the Silent Era

Not all silent pictures were sold for flat fees. As a study of the time notes, "Theaters exhibited special productions and roadshows on a percentage arrangement, but these were usually confined to higher quality pictures which were expected to realize box office receipts that were substantially in excess of the average gross" ("Wellington Theater" 1928, 573). Such films were very different from what exhibitors typically rented, in which sense they were analogous to the early sound films.[23] For example, in 1927, the Pathe Company released the big-budget silent feature *The King of Kings*, directed by Cecil B. De Mille. Up to that time, Pathe had rented its films exclusively for flat fees, because its management had concluded that the necessity of checking receipts simply rendered revenue sharing too costly ("Pathe Exchange" 1928, 404). However, *The King of Kings* was of potentially far greater drawing power than anything Pathe had previously produced. It therefore decided to rent the film to theaters on a share basis

> in order to secure rentals commensurate with the value of the picture . . . The company believed that when an important attraction such as *The King of Kings* appeared in a program, it deserved a substantial proportion of gross admissions, a proportion greater than might be obtained by flat rental."[24]

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[22] Changes could be seen in the pecking order of existing stars as well. For example, Walter Pidgeon was a supporting actor in the silent era, and, as such, made the $500 per week. However, it turned out that he had a very attractive speaking voice; as a result, he was signed to star in talking films for $1750 per week (see *Variety*, October 24, 1928, page 5).

[23] The "Standard Exhibition Contract" that formed the base for all producer-exhibitor contracts limited the number of films designated as "roadshows" to two per season per producer. See *The 1929 Film Daily Yearbook* (801-815).

[24] "Pathe Exchange" (1928, 404-5). They set up two plans: 1) A minimum guaranty to be paid by the exhibitor based on typical previous showings, accompanied by a sharing of receipts up to the guaranty at rates ranging from 33 1/3 percent for the producer percent to 50 percent for the producer, and of all receipts above that at rates ranging from 50 percent to 75 percent for the producer, or, 2) A minimum guaranty plus a split of percentage over a basic amount intended to allow for the theater's overhead, the guaranty, advertising, and a "normal" profit (about 25 percent of the guaranty).

Pathe made one exception—it continued to charge a flat fee to movie houses located in "remote" towns, believing that the cost of checking receipts for those houses would be "prohibitive."

A similar situation occurred with the release of the very popular 1928 silent feature *Lilac Time*, starring one of the silent screen's top actresses, Colleen Moore. A contemporary *Variety* article (August 15, 1928, page 43) notes,

> On the strength of the Cathay Circle Showing, FN has booked *Lilac Time* in Long Beach at an 800 percent increase over the average rental for a Colleen Moore picture for that town. Heretofore, $600 has been an average rental figure [for her] . . . *Lilac Time* was booked at a guarantee of $5000 with a 60-40 split over $16,000 and a minimum run of 3 weeks guaranteed.

Although producers did their best to convince exhibitors that revenues would rise sufficiently to justify these much higher rentals, most exhibitors balked. Such films were very different from the pictures exhibitors usually rented; they found it difficult to predict audience response, accordingly. If the producers wished to receive "commensurate value," they had to take it in contingent form.

D. The Use of Flat Fees During the Sound Era

Turning to the sound era, there were several instances in which share contracts were *not* used. First, producers continued to rent films to very small theaters for flat fees. These neighborhood houses changed bills as often as three times per week and were charged $7 to $15 per day per film (Balio 1993, 27). The reason for the flat charge was simple: the producer's cost of verifying that the attendance figures reported by the exhibitor were correct was simply too high given the tiny revenues that such houses generated. This same problem was the rationale for renting silent-era roadshows for flat fees to "small and remote" cinemas. Small cinemas in small towns pay flat rentals to this very day for exactly the same reason.

> A second exception was the "B," or low budget, movie. While "A" movies cost $300,000 or more to make and were sold on a percentage basis, B-films cost $50,000-to-$200,000 and were sold for flat fees.[25] About half the films produced in the 1930s were "B's;" because they were much

[25] The B-film had several distinguishing characteristics. First, it starred actors who were either unknown, or who had only modest box office appeal (actors would occasionally make the leap from B movies to A movies—John Wayne

cheaper to make, they comprised only about ten-to-fifteen percent of the typical studio's production budget.[26] B-movies emerged primarily as a result of the double feature, which became the predominant mode of exhibition in the 1930s and 1940s (Ricketson, 1938, 78). B-films formed the bottom half of the double bill. Double features had initially presented a challenge to revenue sharing contracts; given that the first feature was made by one studio and the second by another, how was one to identify the individual contribution of each?[27] The initial attempts to divide output between two separate films proved quite costly—representatives of each producer had to meet with the exhibitor to hash out appropriate percentages. It was quickly decided that a simpler and cheaper approach was to have on every bill one high quality feature (the A-film) and one low quality feature (the B-film), and to rent the high quality feature on a percent-of-gross basis, and the low quality feature for a flat fee.[28]

A third exception involved cinemas that continued to organize and present live entertainment into the sound era. They were a distinct minority, but included some important houses in large urban areas—Radio City Music Hall in New York presents live shows to this day. Although these theaters were of the type charged on a revenue-sharing basis elsewhere, when they presented live performances, they instead paid a flat fee for each film they rented.[29] Producers were concerned that the theaters would otherwise lack the incentive to devote the sufficient effort to the live shows, and that

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and Mickey Rooney are two examples). Second, it was rapidly made, usually in less than three weeks, and sometimes in as little as one. Finally, it was shorter than the A-film, lasting only 50 to 70 minutes (John Wayne's B-Westerns were only 45 minutes long). For more detail, see Balio (1993, chapter 8).

[26] See Balio (1993, 313). There were also several small, low budget, producers who specialized in B-films—Republic and Monogram are two examples. These studios were located in a part of Hollywood that was nicknamed "Poverty Row."

[27] See Lewis (1933, 194) for a discussion along these lines.

[28] See Lewis (1933, 194). A *Variety* article of April 1, 1931 announced that the Paramount theater chain intended to rent all its second features for flat fees, because it considered the only other alternative to be "to show two pictures from one producer on the same bill," a practice too difficult to maintain. To reduce the exhibitor's incentive to rent lower than optimal quality B-films, the flat fee was typically deducted from gross revenue before the sharing percentage was applied. This created the contrary incentive, and some contracts therefore contained limits on the rental that could be deducted for a second feature. See Kenney and Klein (1983, 524).

[29] See 1940 Congressional Hearings, as cited in Kenney and Klein (1983, 526). Alternatively, these exhibitors sometimes leased films on a revenue sharing basis, but were able to deduct the cost of the stage show from gross revenue up to some maximum before applying the sharing percentage.

movie revenue would suffer accordingly.

E. What People Said at the Time

Lewis (1933, 190) provides a contemporary take on the effect of sound on exhibition contracts. He begins by describing the occasional silent-era experiments with revenue-sharing (such as described immediately below), and concludes that the costs involved—specifically, the threat of exhibitor shirking and the cost of monitoring honest reporting of attendance revenue—rendered revenue sharing impractical. However, he notes, sound brought about a change in opinion. The higher revenues that sound films generated made a systematic verification of receipts more cost-effective, while the concomitant decline in the importance of live shows meant that producers needed to be less concerned with exhibitor shirking. And according to Lewis, it was the uncertainty surrounding the value of the early sound films that gave contracting parties the final shove. Producers wished to charge higher prices for sound films than they had for silent (without higher prices, the more expensive sound films were not worth making) and thought potential audience response rendered those prices justifiable. The increase requested was substantial.[30] At the same time, the value of those pictures was more difficult for theater owners to gauge, which substantially complicated the process of negotiating prices. As an exhibitor of the time stated, "the fact that the new pictures were proving very popular and that he had no experience by which to judge their possibilities" convinced him to sign a share contract instead of pressing for the flat rentals that he had formerly preferred ("Willard Theater", 1928, 593).

[30] A July 25, 1928 column in *Variety* (page 48) stated, "[There is] not much question but that the film makers are charging high for talking films. It's nothing for Warner's to ask $1000 or more for a full length talker in a town of 75,000 or less, as against perhaps the $250 usual rental paid for a silent feature." A June 21, 1932, page 1 article in *Variety* commented on Al Jolson's second talking picture, the 1928 feature *The Singing Fool*, "*Fool*, typical of other talkers early in the stage of sound, received rentals which prior to sound would have seemed mythical."

V. THE IMPLICATIONS OF THE EVIDENCE FOR THE FACTORS SUGGESTED TO AFFECT CONTRACT CHOICE

A. Moral Hazard

In a simplified sense, one can think of sound as reorganizing the production process. A film presentation is created from a variety of inputs, including projection, seating, sight, and sound. During the silent era, only "sight" was supplied by the producer, and even that incompletely:

$$\textit{Silent Presentation} = f(projection_e, seating_e, sight_e, sound_e, sight_p)$$

where $i = e,p$ indicates whether exhibitor or producer supplied the input. The coming of sound transferred the responsibility for sound to the producer, and eliminated the exhibitor's contribution to sight (i.e., the live acts) as well:

$$\textit{Sound Presentation} = f(projection_e, seating_e, sight_p, sound_p)$$

Flat fee rentals (β=0) give exhibitors a greater incentive to provide the optimal level of their inputs than does revenue-sharing. Those inputs were more much more extensive during the silent era. And as the discussion of the previous section indicated, live acts and musical accompaniment were not simply a pleasant sideline, but were considered *at least* as important to customers as the films. Accounts of the time demonstrate that producers took the possibility of exhibitor shirking in the provision of these inputs seriously. For example, a 1928 interview with the sales manager of a large film production company concludes, "It was his belief that when an exhibitor did not have to guarantee a certain return to the distributor, the inclination was to ignore the live acts. . . . [and] to let the picture do its own work" ("Sidley Pictures Corporation", 1928, 330).

The arrival of sound eliminated the live act, and thus reduced concern about exhibitor shirking. Revenue sharing became more attractive as a result. In fact, once sound films were the norm, movie producers began to actively push for the removal of live entertainment from the cinema, presumably so that the revenue generated would depend more completely on their own efforts. Crafton (1997, 252) writes, "Hollywood developed specific strategies to kill off live acts." For example, sound shorts were made that attacked live shows—one producer even released a short film entitled "Sentencing the Live Prologue to Death." Crafton also quotes United Artists executive Joseph

Schenck, who traveled around the country proclaiming, "Good pictures never needed acrobats or spangles."

The importance of moral hazard concerns are also indicated by the fact (noted in the previous section) that exhibitors who continued to present live shows into the sound era continued to be charged flat fees, although comparable cinemas without live shows rented films on a revenue-sharing basis. Producers worried that revenue sharing would blunt the incentives of exhibitors to provide the optimal amount of effort in the provision of their important live inputs.

B. Risk

As noted in section II, flat fees generate the optimal provision of exhibitor inputs, but at the cost of placing all the risk of uncertain audience response on the exhibitor's shoulders. The decline of the live act that accompanied sound created the opportunity to shift more of that risk to the producer. Furthermore, as the previous discussion indicates, sound also increased the uncertainty over film performance, by changing the nature of the product and the roster of stars.

Nonetheless, other facts suggest that risk-bearing concerns were *not* an important influence on the change in exhibition contracts. First, the uncertainty over audience reaction to early sound films, just like the uncertainty over audience response to the silent roadshows, did not appear to have generated concern about the riskiness of film revenue per se, but rather to have increased the difficulty in agreeing to an ex ante price (more on that in the next section). Second, flat fee rentals were still used (and are still used today) for the small, remote cinemas, just as they were when silent-era roadshows sold elsewhere on a revenue-sharing basis. The motivating factor was the cost of monitoring the honest reporting of attendance figures, which was largely independent of the size of the cinema in question (see section D below). The revenue that small, remote cinemas generated was simply insufficient to cover the monitoring cost that revenue-sharing required, so flat fees were used instead. However, these small cinemas tended to be owned and operated by sole proprietors, who most probably had a larger portion of their wealth in the operation than did the owners of the publicly-held chains that were (and are) rented films on a revenue-sharing basis. The small exhibitors were thus plausibly more risk averse, and certainly not less risk averse. The fact that they paid flat fees anyway,

while larger operations were charged a percent of the gross suggests that the switch to revenue sharing that followed sound was not inspired by concerns with the optimal allocation of risk.

C. The Cost of Pre-Sale Measurement

Before contracting for a film, a producer and an exhibitor must negotiate the appropriate price. If there were no variation in film quality (i.e., in expected attendance revenue), or very predictable variation, such negotiations would be simple. But the fact that films are highly heterogeneous provides exhibitors with the incentive to seek to measure film quality before agreeing to a purchase. However, precise ex ante measurements of film quality are very costly, because a film's value (in terms of potential for generating revenue) can only be determined by observing actual audience response (see DeVany and Walls 1996). Given such costs, one would expect that ways to avoid pre-sale measurement efforts would be found, and indeed, relatively little pre-sale measurement occurred. Exhibitors throughout the silent and sound eras dealt with the same producers year-after-year, and bought many of the same kinds of pictures. During the selling process, producers would provide such information as the title, plot, actors, and/or director of the films under negotiation, insufficient for a precise prediction of audience response to that particular film, but enough to indicate the approximate value of the group of films that were being contracted for. As a result, contract negotiations could proceed with a minimum of film-per-film haggling.

What was required, however, was a clear and shared (between exhibitor and producer) agreement on the value of the "typical" film. The sudden appearance of sound meant that this was no longer so. The more difficult to predict the ultimate success of a film, the more expensive it became to negotiate the appropriate flat rental fee. As result, the share contract became the more attractive alternative. As noted above, contemporary accounts of the change in contract emphasize the difficulty that producers and exhibitors had negotiating a mutually acceptable price for the early sound films. The same dynamic was apparent with respect to silent-era *King of Kings*-style roadshows, the ex ante value of which were also more difficult to gauge than for the typical silent film. When the Pathe Company claimed that revenue sharing was necessary to get exhibitor payments for its film *The King of Kings* "commensurate with value" (see section IV.B), it was acknowledging the unwill-

ingness of exhibitors to increase their fixed payments in line with what Pathe expected to be the increase in demand. For a $2 million movie such as *The King of Kings* to earn Pathe a "commensurate return," rental fees would have had to be tripled above those usually paid ("Pathe Exchange", 1928, 406). But convincing exhibitors that the film's attendance figures would justify such prices in the form of flat fees would have been highly costly.

D. The Cost of Dividing Output Ex Post

Lewis (1933, 192-194), in his early history of the motion pictures, examines of the use of share contracts and concludes,

> An important consideration was the dishonesty of some exhibitors and the distributor's inability to provide an adequate and economical box office checking system. . . . The seriousness of the problem of checking receipts at times threatened to disrupt the entire percentage system.

The basic problem was that theaters had a strong incentive to under-report attendance. To counteract that incentive, producers randomly placed men in theaters to count the number of people in the audience.[31] There were three ways of checking receipts: the checkers could take tickets at the door, they could count tickets after the box office had closed, or they could examine opening and closing ticket numbers. The first was disliked by exhibitors—the checker had to supplant the regular doorman, which, it was feared, would lead patrons to conclude something was wrong at the cinema; furthermore, important customers could be upset if free passes were questioned. The second method was quite laborious and required the checker to work late into the night—box offices normally did not close until 9 p.m. or 10 p.m. Distributors worried that checkers would simply submit false reports so as to quit early. The third method was the most widely employed, but could be stymied by the use of old tickets, or the redistribution of previously-distributed ticket halves.

Not only was putting a man in the theater costly, the checkers were often dishonest themselves. A producer contemplating revenue sharing noted that "it was common knowledge that check-

[31] In the early sound period, checkers were hired by the day at a cost of $5, plus $5 for expenses, plus transportation. Such checking was done sporadically and randomly; see "Shaefer Pictures Corp." (1929) and Lewis (1933, 195) for what follows.

ers had resorted to various forms of theft, such as making agreements with exhibitors and reselling tickets" ("Shaefer Pictures Corp.", 1939, 339). Today, specialty firms exist, whose sole purpose is to check attendance figures on behalf of film companies.[32] There were also concerns among exhibitors, who worried that producers would use the provided information to demand a higher price the next time around, or even to open a competitive movie house.[33] Given all these problems, Lewis (1933, 196) concludes that, "it is doubtful that percentage pricing can be justified."

Yet sound pictures brought percentage pricing in their wake. However, what changed was not the monitoring problem; but the film's average gross, which increased substantially with the coming of sound (see table 1). Thus, if one can assume that the cost of the monitoring remained roughly constant, monitoring costs per dollar of film revenue declined.[34] Revenue sharing became relatively more attractive, accordingly.

The importance of the cost of the ex post division of output to the choice of contract form is illustrated by two of the uses of flat fee rentals during the sound era. First, smaller cinemas were invariably charged flat fees, for the explicit reason that the cost of monitoring the exhibitor's reporting of attendance revenue was too high. This was true of the silent-era roadshows, true of the early sound films, and is true today. Second, B-movies were rented for flat fees, because the cost of dividing revenue between two films shown simultaneously was simply judged to be too high. In short, the ex post division of output appears to have been an important influence on the choice of contract form.

E. Summary of the Findings

The preceding discussions suggest that moral hazard concerns, the cost of pre-sale measurement, and the cost of dividing output ex post were all altered by the coming of sound. A scholar of the time —Howard Lewis of Harvard Business School—examined the changes in movie exhibition

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[32] For example, the *Motion Picture Almanac* (1985, 431) lists five firms under the category "Checking Theater Attendance."

[33] See "Sidley Pictures Corp." (1928, 334).

[34] In addition, the Depression brought about a fall in real wages that may even have reduced that cost, although percentage pricing was well ensconced before the 1929 stock market crash.

contracts that accompanied sound technology. Lewis (1933, 190) recounts how early, silent-era experiments with revenue-sharing had highlighted what he called, "the principle weaknesses in the system: *inadequate exploitation* [by the exhibitor], and the *difficulties involved in checking receipts*." [emphasis added] He then continued,

> The advent of sound pictures, however, brought about a complete change of opinion [on the desirability of share contracts]. Sound pictures were of *unknown worth at the box office*, though it was obvious from the time of their introduction that they possessed great novelty value. The producers and distributors, on the one hand, wished to prosper from the increased attendance; *since they were unable to measure the potentialities of the sound film, however, they could not determine rental increases fairly and accurately*. . . . Many exhibitors, on the other hand, *wishing not to be burdened with higher flat rentals for pictures of unknown drawing power,* acceded to the percentage rental system.

Audience response to sound films was highly uncertain during the early years, which substantially increased the cost of agreeing to a flat fee rental. Attempts at revenue sharing followed. At the same time, the concerns over possible exhibitor shirking ("inadequate exploitation") and the cost of ensuring the accurate ex post division of attendance revenue ("the difficulties involved in checking receipts") that had discouraged the use of revenue-sharing on a wide scale during the silent era declined in the ways described. As a result, revenue sharing became the norm.

VI. CONCLUSION

Silent films were sold by producers to exhibitors for flat, per-day fees, ranging from as much as $1000 per day for large first-run cinemas in major metropolitan areas to as little as $7 per day for small neighborhood houses. Revenue sharing was used only rarely, because (1) contracting parties worried that a straight splitting of revenue would reduce the efforts made by exhibitors to support the film with live musical (and other) acts, and (2) the cost of ensuring honest reporting of revenue (essential to a share contract) was seen as prohibitive given what each film generated.

The technology shock represented by sound altered the structure of the incentives in film exhibition, and thus changed the nature of exhibition contracts. Because sound eliminated the live act, it substantially reduced the role of the exhibitor, and thus concern about exhibitor shirking. In addition, sound films earned more revenue on average than silent films, increasing the potential returns to

monitoring the ex post division of receipts. However, it was a final factor that clinched the change: sound films were (initially at least) substantially more uncertain in their performance than silent films, raising correspondingly the cost of negotiating a lump sum rental payment. There was a fundamental lack of knowledge about what a sound film should be, and directorial, cinematographic, and acting techniques had to evolve to take advantage of the new technology's potential. Simultaneously, an entire roster of movie stars disappeared, and a new one emerged. Given the difficulty in agreeing to the appropriate flat rental fee, revenue sharing emerged as an alternative. As Lewis (1933, 191) writes,

> Despite the difference of opinion [on the attractiveness of share contracts], both exhibitors and distributors agreed that the advent of sound, inasmuch as its effect might be revolutionary, provided a means for trying out such an experiment. . . .Therefore, distributors made many sales under percentage agreements for the 1928-1929 season." (191)

This analysis has thus demonstrated that several factors contributed to the adoption of revenue sharing as the major form of contract in movie exhibition. Encouragingly for economists, they are the factors that relevant economic models would predict. Movie producers were well aware of the effect of their choice of contract on the possibility of moral hazard, and they were concerned that a movement away from the flat fee would reduce exhibitor efforts to increase attendance revenues (that is why the initial share contracts included minimum guaranties). Producers were also aware that exhibitors could not be depended on to report revenue honestly, and that efforts to ensure honesty would be costly. The sound film, generating more revenue on average, requiring less intensive exhibitor provision of inputs, and, just importantly, being initially more uncertain in its performance than the silent film—and thus more costly to negotiate a flat price for—impelled a switch to revenue sharing. Within several years of the release of *The Jazz Singer*, the form and nature of the sound film had stabilized, a new roster of movie stars became well-known, and the performance of sound films was much more predictable than it had been initially. But by then, revenue sharing was ensconced, used for all but those films and cinemas where the cost of verifying output was too high given the prospective gains, or where exhibitor inputs (in the form of the live act) were especially important.

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TABLE 1: MOVIE DATA

Year	Number of feature films	Weekly attendance (millions)	Attendance per film	Annual box office receipts (millions)	Annual receipts 1967 $(millions)
1917	687				
1918	841				
1919	646				
1920	796				
1921	854				
1922	748	40	53,476		
1923	576	43	74,653	337	657
1924	579	46	79,447		
1925	579	48	82,902	367	670
1926	740	50	67,568		
1927	678	57	84,071	526	1012
1928	641	65	101,404		
1929	562	95	169,039	720	1403
1930	509	90	176,817	732	1464
1931	501	75	149,701	719	1577
1932	489	60	122,699	527	1289
1933	507	60	118,343	482	1242
1934	480	70	145,833	518	1292
1935	525	75	142,857	566	1377
1936	522	88	168,582	626	1509
1937	538	85	157,993	676	1572
1938	455	85	186,813	663	1571
1939	583	85	145,798	659	1584
1940	477	80	167,715	735	1750

Source: Steinberg, Cobbett S., *Film Facts*, New York: Facts on File Inc. (1980); *Historical Statistics of the U.S.* (1975)