

The Role of Revenue Sharing in Movie Exhibition Contracts

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Abstract

This paper examines the nature of contracts in the movie exhibition industry, where contracts are both movie and theater specific, and entail revenue-sharing terms that change over time within the contract period and no fixed fees. We argue that the structure of these contracts is best explained by the distributors' desire to devise relatively simple pricing formulas that extract downstream exhibition profits while maintaining exhibitor incentives to keep the movie on the screen. We test the implications of this simple price discrimination or rent extraction argument for revenue sharing in this industry using detailed information from Spanish distribution contracts. Compared to data from the US exhibition industry, our data have the advantage of being comprised of two sets of movies with very distinct informational characteristics, namely movies previously released in the US and movies that are released first in Spain. We use the differential information available at the time of contracting for these two groups of movies, as well as other movie and theater characteristics, to differentiate our explanation from the more standard risk-sharing and moral-hazard based explanations found in the literature.

1- Introduction

Share contracts are used in a wide variety of contexts, both within and between firms. Of course, fixed salaries are the norm in most employment relationships. Still tenants regularly earn a share of their output in land contracts, employees may be paid commissions based on output or sales, and managers and partners in professional service industries often share in their firm's profits. Sharing also occurs between firms, in, say, franchising, licensing and joint venture contracts, all of which occur in a variety of industry settings. Sharing is also particularly prevalent in certain industries or in relation to specific transactions, from real estate brokerage to author/publisher contracts, from auctioneer to lawyer compensation, and from retail real estate leasing to owner-operator contracts in trucking. Sharing is especially ubiquitous in the movie industry where we see talent being paid a share of revenues or profits (see Chisholm, 1997; Weinstein, 1998), studios receiving a share of box office revenues from the movies they produce, distributors sharing box office revenues with exhibitors or theaters (see Hanssen, 2002; Filson et al., 2004; Gil, 2004), and finally the same distributors sharing revenues with video stores (Mortimer, 2006; Cachon and Larivière, 2005; Dana and Spier, 2001).

The literature on share contracts in economics has evolved from its early days, when authors decried the existence of such backward institutions as sharecropping. In a well-functioning market, it was argued that such contracts would disappear in favor of single price contracts yielding first-best efforts and outcomes (see e.g. Cheung, 1969, for references). The persistence of various forms of sharing in developed economies has led authors to reconsider why such contracts are used and develop a new consensus whereby they are seen as solutions to incentive problems. Early contributions in this regard proposed that these contracts were solutions to the basic incentive/insurance tradeoff in agency relationships (Stiglitz, 1974; Holmstrom, 1979). Soon Reid (1976) and Rubin (1978) were suggesting instead that these contracts solved incentive problems on both sides of the equation, for principal and agent.¹

In this paper, we consider yet another explanation that we believe accounts for the ubiquity of

¹ Eswaran and Kotwal (1985) formalize Reid's argument, and Bhattacharyya and Lafontaine (1995) show how the uniform and stable share parameters in franchise and other contracts can easily arise under two-sided moral hazard.

share contracts especially in the movie industry but also in other settings. Our work builds on arguments in Mortimer (2006), Cachon and Larivière (2005) and Dana and Spier (2001) to emphasize the role of uncertainty – as opposed to risk – as the fundamental reason for the widespread reliance on share contracts in this industry. In particular, we emphasize two different types of uncertainty. The first is ex-ante uncertainty due to asymmetric information between distribution and exhibition. In other words, the exhibitor may know the value of a movie in his theater better than the distributor does, and has incentives to hide this information to capture a higher share of the surplus. The second type is ex-post uncertainty. Specifically, neither the distributor nor the exhibitor knows how a movie will perform ex-post in a given theater. We argue that it is the combination of both types of uncertainty about the value of any given movie in any given market, and the desire of distributors to price discriminate across theaters and markets using relatively simple pricing rules, that leads them to rely on revenue-sharing contracts. Their goal in devising the revenue-sharing formulas is to capture the willingness to pay of the theaters while minimizing contracting costs. From an agency-theoretic perspective this explanation emphasizes the theaters' participation constraint rather than their incentive constraint (see Oyer (2004) or Lafontaine and Masten (2002) for applications of similar ideas to stock-option-based and truck driver compensation schemes respectively). From a transaction-cost theory perspective, our explanation emphasizes the firms' desire to minimize measurement, search and contracting costs ex-ante, as well as renegotiation costs ex-post.²

Our choice of the movie distribution industry as our empirical setting is predicated on several factors. First, as described by Hanssen (2002), share contracts have been the norm in this industry since the advent of “talkies” in the 1920's, and so they represent a stable organizational feature of this industry that deserves attention. Second, contrary to most other contexts considered in the literature, these contracts do not simply stipulate the same affine sharing rule to be applied to many transactions, but instead are theater and movie specific, and the shares decrease at more or less rapid rates over time since

² Thus our work relates to Barzel (1982), Masten (1988) and Bajari and Tadelis (2001), where the latter model contract choice (between fixed price and cost-plus) as a function of product complexity, which in turn affects the optimal trade-off between high-powered incentives and ex-post renegotiation costs.

movie release. These share contracts also do not involve any fixed fees. In other words, these contracts differ in important ways from those used in other contexts, and understanding why this is the case is of interest. Third, this industry is characterized by costs of production and distribution that are mostly fixed and/or sunk. This in turn has implications as to the incentive effects of revenue sharing since maximizing revenues in exhibition will maximize profits as well in distribution and production. Fourth, and finally, while the literature has tended to favor incentive arguments to explain sharing generally, in the movie distribution industry Filson et al. (2004) argue that moral hazard issues are not important, and so they conclude that risk sharing best explains the form of the contracts. Our data allow us to reconsider the issue of risk sharing specifically.

Our empirical analyses make use of a unique data set with detailed information on 10,167 different contracts used in the distribution of 430 movies shown in 91 different theaters in 51 different markets (cities) in Spain between January 2001 and June 2002.

We begin by showing empirically that a movie's release in the US and a movie's US box office revenues are very good predictors of a movie's Spanish box-office revenues. In fact, because Spanish industry members use US box office results to form expectations about likely Spanish results, they consider movies not previously released in the US to be riskiest than even the group of worse performing US-released movies.³ Assuming, per Filson et al. (2004) and others in the literature, that exhibitors are more risk averse than distributors, an optimal risk-sharing contract would involve a higher share for distributors for the former set of movies compared to the latter. In reality, we find that non-US released movies are offered under basically the same terms as the less risky "low success" US released movies. As we show below, our explanation, based on expected movie values rather than risk, predicts the similar contract terms we observe for these two sets of movies.

We also find that distributor shares are highest, and decrease more slowly with weeks since release, for movies that are expected to be more popular. On the other hand, these shares are smaller for movies released concurrently with other large box office revenue generating movies, and when the

³ We obtained this information through a series of personal interviews with industry insiders in Spain.

distributor is dealing with larger theaters and or with those located in less competitive markets. All of these data patterns are consistent with our price discrimination explanation. Finally firms do not include fixed fees in contracts in this industry, a feature of these contracts that remains puzzling under both risk-sharing and moral-hazard arguments but that we show to be consistent with our explanation of minimizing search, measurement and ex-post transaction costs.

The paper is organized as follows. In the next section, we introduce our framework and model distributor/theater relations in the motion picture industry. Our model generates several testable implications that we discuss in some detail. We then present our data in Section 3, followed by our methodology and results in section 4. Section 5 concludes.

2- Framework and Model

In his study of the evolution of contracting practices in the movie distribution industry, Hanssen (2002) notes that share contracts became the norm in the industry with the advent of sound. Before sound, movies were short, relatively undifferentiated products that exhibitors presented in their theaters along with live shows. Such movies were only a small component of the evening's entertainment and as such, exhibitors purchased them at fixed prices like any other product. In fact, Hanssen mentions that movie theaters needed such large numbers of these movies that movie exchanges were created, where individual theaters could obtain movies for short periods of time. With the advent of sound, he explains, came more elaborate and longer movies that cost more to produce, which, in turn, changed the structure of the relationship between distributors and exhibitors. The result was a shift towards revenue sharing throughout the industry, a shift that was possible because, Hanssen argues, distributors already had technology in place that allowed them to measure their movie's revenue in each theater.

Mortimer (2006), Cachon and Larivière (2005) and Dana and Spier (2001) discuss the more recent emergence of revenue sharing in the video rental industry. They describe how such contracts arose when distributors found a mechanism to monitor video rental revenues for each movie separately. In other words, the industry moved to such contracts when attendant measurement costs were reduced importantly. The question we address in what follows is: why did movie distributors choose to organize

their transactions with exhibitors under this type of contract? We develop a very simple model that emphasizes the role of different pricing schemes used by distributors in the extraction of as much surplus as possible from exhibitors and that we believe captures the main features of the industry that affect this decision, a model whose implications we take to data below.

2.1 The Model

We assume a monopolist who sells his product to several buyers. The costs of production are all incurred prior to sales, so the cost of selling to one more customer is zero.⁴ To focus on our pricing argument rather than risk-sharing, we assume that the monopolist and its buyers are risk neutral. Thus the monopolist's objective is simply to maximize its (expected) revenues. We assume that buyers each buy a single unit of the good, and have different valuations for it. It is well known that under these circumstances, the monopolist will maximize revenues by selling to all customers whose valuations are above zero, and setting a price for each such customer that is equal to their willingness to pay (perfect price discrimination).

Now consider the sources of differences in customer valuations in our setting. Buyers here are exhibitors who purchase the right to show a movie on a screen for a yet to be determined number of weeks. Several features of the institutional setting need to be taken into account in our model.

First, distributors and exhibitors negotiate separate contracts for each movie/theater combination. In other words, transactions are not bundled across movies in a theater nor do they need to be identical for all theaters showing the same movie.⁵ Each contract is negotiated several weeks prior to the movie's release. We argue that both parties to this transaction can benefit, in the sense that total surplus from their transaction is maximized, if they set the terms of the contract to minimize the sum of negotiation and

⁴ Distributors may also pay a proportion of box office revenues to the producer for the right to distribute the movie. In that case their costs are not all sunk. However, this does not give rise to any perverse incentives in the present case: whether the distributor maximizes a proportion of box office revenues or total box office revenues does not affect the distribution decisions we are interested in.

⁵ The block booking of movies, that is the practice of selling them in packages on an all or nothing basis, was declared illegal in the US by the Supreme Court in 1948, in the *Paramount* decision. See Kenney and Klein (1983, 2000) and Hanssen (2000) for analyses. Of course this decision does not apply to Spanish distributors. Nonetheless, we find no bundling of movies in our data.

renegotiation costs. Since most movies stay on the same screen for a number of weeks, they save on such costs by setting the terms for several “weeks” together in a single contract, i.e. by “bundling” weeks.⁶ However, as they know that movie revenues go down in relatively predictable ways with weeks since release, the parties do not apply the same share parameter to each week: they instead negotiate ahead of time a sequence of revenue sharing terms, where the share of the distributor gradually decreases with weeks since release.

Second, exhibitors set movie ticket prices.⁷ They do not change the price to movie-goers in the short run based on movie quality or attendance (see Einav and Orbach, 2006). Hence in what follows we take this price as exogenous in the short run, though we allow it to vary across theaters. In reality, prices vary little across theaters in a city, and one might argue that competitive forces are such that consumer prices are exogenously determined in this industry.

Third, exhibitors, not distributors, decide how long to keep a movie on their screen.⁸ In fact, we would argue that deciding which movies to put on which screens and for how long is the main role of exhibitors, and that it is the exhibitor’s incentives to do this correctly that is directly aligned with that of the distributor when the two share box office revenues. When a movie does not bring in enough customers at the going price, theaters replace it with a new release from a different or the same distributor (i.e. they “pull” the movie).⁹ There is an understanding in the industry, however, that the exhibitor can request a renegotiated share for a given week if attendance levels are below expectations. This has the advantage of introducing flexibility such that theaters will not pull the movie as early as they might if the

⁶ See notably Kenney and Klein (1983) for a detailed discussion of bundling to save transaction costs. However, in this industry, the parties write a single contract but set different “prices” or, more precisely, different shares for the different weeks.

⁷ In the U.S., the *Paramount* decision and antitrust rules against RPM (among other things) prevent producers and distributors from setting retail prices. In Spain, we find nothing about ticket prices in the contracts.

⁸ Contracts for movies that do exceptionally well in the US sometimes include some minimum showing length requirements. However, in our discussions with them, industry members indicate that these clauses are rarely binding. In addition, contracts stipulate sharing terms and their evolution over a number of weeks. However, while the agreement stipulates duration in that sense, the theater can stop showing the movie at any time within the set of weeks described in the contract, or keep it beyond that duration as well. Industry norms then imply that the last distributor share stipulated in the contract applies to all weeks beyond those contracted upon.

⁹ This option that exhibitors have of pulling the movie clearly contributes much to the constancy of prices set for customers; instead of decreasing the price for less popular movies, exhibitors simply replace them with newer more popular ones.

contract terms were applied rigidly. These revised shares, though agreed upon only at the end of the movie’s run in a given theater, are always week specific. Hence the relevant transaction that is priced in the contract, and for which renegotiation may occur, is at the movie-theater-week level. Of course, distributors would have no reason to renegotiate terms once the run has ended were it not for their desire to do business with the same exhibitors in the future. In that sense, the “shadow of the future” plays an important role in the functioning of this market.

Finally, regardless of the contract terms agreed upon for box office revenue, the exhibitor retains full residual claimancy over concession profits. We expect this occurs because exhibitors are in the best position to tailor concession offerings to the tastes of local customers, and to supervise labor locally, making it optimal from an incentive perspective to give them full ownership of the profits arising from such activities.¹⁰ Note that while concession sales are only a small part of the operations of a theater, they can make the difference between profitable and unprofitable operation (see e.g. Vogel, 2001).

Taking these institutional features as given, an exhibitor’s profits from showing movie i in week t prior to any payment to the distributor, can be written as:

$$\pi_{ijt} = q_{ijt} * p_{jt} + S(q_{ijt}) - C_{ijt}$$

where p_{jt} is the price of a movie ticket at theater j in week t , q_{ijt} is the number of tickets sold for movie i that week in that theater, S_{ijt} are concession profits, and C_{ijt} is the cost of showing the movie that week, which includes the cost of not showing the next best alternative on the screen. We subsume the uncertainty about costs, quantities and concession sales in the assumption that π_{ijt} is normally distributed with mean v_{ijt} and variance σ^2 . We further assume that there are N theaters in the markets, and that expected profits vary across theaters, movies and weeks, based on both market and theater characteristics: specifically, we assume that v_{ijt} , the expected profits at theater j showing movie i in week t , is uniformly distributed on $[v_l, v_h]$. Since v_{ijt} represents the value of showing movie i relative to showing the next best

¹⁰ See Slade (1996) for another context – gasoline retailing – where the downstream agent retains full residual claimant rights on other activities (i.e. car repairs or convenience store sales) regardless of the agreement that governs gasoline sales at the station.

alternative, the lower bound on this value, v_l , can clearly be negative.¹¹ In fact, one can think of as representing theater losses when the movie basically brings in no customers, while represents theater profits when the theater is filled to capacity. Since capacity and costs vary across theater weeks, these factors feed into the variance in expected profits across theaters.

Suppose that each theater knows its expected profits from showing a given movie in its market in a given week, but that the distributor only knows the distribution of expected profits across theaters. Ranking the theaters from the one with the highest expected value to the one with the lowest expected value yields a downward sloping linear demand curve with a choke price of v_h . If the distributor sets a fixed price M_{it} for the right to show movie i in a given week, then only those exhibitors that expect profits above this level will choose to show the movie, or keep it on the screen that week. It is well known that the optimal fee then is $v_h/2$ and that exactly half of the theaters with positive expected profits, the half with the highest positive profits, will find it attractive to show the movie at that price. Distributor profits under this scenario are

$$\Pi_{it} = \frac{n_{it}}{2} \frac{v_h}{2} = n_{it} v_h / 4$$

where we use n_{it} to denote the number of theaters, out of N , with positive expected profits for the movie that week. Note that all theaters but the marginal one, the one with expected profits of $v_h/2$, earn rent in this scenario. As a group, theaters earn economic rent of $n_{it} v_h / 8$ from showing this movie.

Now suppose instead that at the time of contracting, the distributor could obtain perfect information concerning the exhibitor private information (the v_{ijt}) and set a price equal to the expected value of the movie for that theater, by spending an amount I per theater, which again, for simplicity, we take to be the same for each theater, movie and week. The profit of the distributor then is simply the sum

¹¹ Note that if the variance in movie values was relatively small, then distributors could set a single price per movie, the same for all theaters. This, of course, was the solution adopted during the silent era. In some cases this average price would be above the realized value of the movie for the theater, and sometimes it would be below. In expectation, however, the exhibitors would earn enough to satisfy their participation constraint. As mentioned by Hanssen (2002), the solution of uniform movie prices was replaced by the current system of box office revenue shares exactly when the differences between movies became especially important. This is because parties then often had incentives to try and negotiate prices that were different from any mean contracted price M : the value of the movie to the exhibitor and/or distributor was so different from the average value of movies that either distributors or exhibitors would refuse to transact at the average price.

of all the positive expected profits across all theaters, minus the investment costs, which it incurs for all theaters:

$$\Pi_{it} = \sum (v_{ijt} | v_{ijt} > 0) - NI = \frac{n_{it} v_h}{2} - NI .$$

The distributor will choose to invest and learn the expected value of its movie in each theater/week if

$$n_{it} v_h / 4 < \frac{n_{it} v_h}{2} - NI, \text{ or } I < \frac{n_{it} v_h}{N 4} .$$

Now suppose that while the distributor must incur the cost I to learn about expected profits in each theater, she can price the movie based on a particular measure of output that is observed at no extra cost, namely box-office revenues. Of course, there is a strong correlation between realized box office revenues and expected profits: $v_{ijt} = E[p_{jt} q_{ijt} + S(q_{ijt}) - C_{ijt}]$. For example, given p_{jt} , if we assume that concession profits are proportional to attendance, and that C is fixed, then the realization of q_{ijt} determines actual box office revenues, and its expectation determines v_{ijt} as well. Thus setting a price proportional to box-office revenues ex ante amounts to setting a price that is proportional to v_{ijt} , on which the two parties can agree ex ante. Realized box office revenues, moreover, account for differences in outcomes relative to expectations, and in that sense a formula based on it give assurances to both parties that the price to be paid will more often remain within the range of acceptable prices for both parties even when realized outcomes are different from expectations. We come back to this below. For now, we note simply that using a pricing scheme for the movie that is based on box-office revenues allows the distributor to obtain higher revenues from those theaters that value the movie more without incurring the cost I for each movie each week in each theater. Put differently, distributors fundamentally sell viewers to theaters – given p_{jt} , requesting a share of box office revenues amounts to requesting a price per theater customer. And since theaters benefit from movies only to the extent that they bring in customers, this pricing scheme aligns the incentives of both distributors and exhibitors, focusing them both on maximizing viewership.

More precisely, assume for simplicity that $ES(q_{ijt}) = \alpha q_{ijt}$ and $EC_{ijt} = C$, such that for every theater, expected q_{ijt} , or \bar{q}_{ijt} , determines expected profits each week. Under box-office revenue sharing, where the share to the distributor is r , exhibitor expected profits in any given week can be written as

$$R_{ijt} = (1 - r)p\bar{q}_{ijt} + \alpha\bar{q}_{ijt} - C.$$

Of course, only theaters that expect positive profits will choose to show the movie. The marginal exhibitor, given a share r , is the one whose expected profits are exactly 0, or the one for which

$$(1 - r)p\bar{q}_{ijt} + \alpha\bar{q}_{ijt} = C,$$

or the one such that

$$\bar{q}_{ijt}^* = \frac{C}{\alpha + p(1 - r)}.$$

In other words, only those exhibitors who expect quantities above this level will choose to show the movie under a box office revenue sharing contract where the share is set at r . At that quantity,

$$v_{ijt}^* = \frac{(p + \alpha)C}{(p + \alpha)(1 - r)} - C = \frac{rC}{1 - r}$$

which is greater than 0 if $0 < r < 1$. Thus contrary to the case with perfect price discrimination, not all theaters with above zero expected returns, or above zero v_{ijt} , will choose to show the movie. However, if C is relatively small compared to the maximum returns a theater can earn, or v_h , as we expect it to be, and r is near 0.5, as it tends to be, more than half the theaters with positive expected returns, or more than $n/2$, theaters will show the movie in this case. In addition, for each theater that shows the movie, the distributor will obtain a price that is closer to the value of the movie in that theater than under a single price policy. Combined, these two effects will potentially yield higher profits to the distributor under this type of pricing compared to either a fixed fee contract for each theater each week, or the perfect price discrimination contract with a cost of I per week per theater. In reality, however, as we describe further below, box office revenue sharing contracts in movie distribution entail varying shares – that is the share is not set at the same level for all theater/weeks. In other words, distributors tailor shares to some extent based on expected attendance, charging less to some theaters and as time since release increases.

Assuming that theater/weeks with lower expected attendance will be charged a lower share, as we show below is the case, implies that the distributor will be able to further increase the participation rate towards the first-best number of theaters showing the movie, and to extract rent to an even greater degree than they could under contracts with the same share for all.

Note that instead of sharing box office revenue, the distributor could charge a fee based on quantities of tickets sold each week or based on exhibitor profits. Given fixed ticket prices in the short run, the difference between using tickets sold and box office revenues as the basis for compensation is not obvious. However, if the fee paid to distributors were based on quantities of tickets sold, exhibitors would have incentives to increase ticket prices and increase profits through concession sales. Distributors could prevent this by requesting a percentage of the ticket price for each ticket sold, which of course amounts to charging a proportion of box office revenues. On the other hand, basing pay on exhibitor profits would require that distributors have good estimates of the cost of showing the movie each week in each theater, which would be costly to obtain. If distributors had to invest in information they would just find out the true valuation of each theater and perfectly price discriminate.

It is important to note that when exhibitor costs are fixed or sunk, as we argue they are, the exhibitor who earns a share of box office revenues maximizes its profits also by maximizing box office revenues. Hence if there are some variable cost activities that the exhibitor can engage in to affect ticket sales, activities whose costs we have not modeled - e.g. supervising workers involved in such sales - the exhibitor's incentives to carry these out will be closely aligned with those of the distributors as long as these activities remain only a small portion of exhibitor costs.¹²

More generally, given a price for moviegoers that is fixed in the short run, revenue sharing fees give incentives to exhibitors to maximize total box-office attendance in their markets by choosing the right movies and making the right decisions about how long to keep each on their screens. This, in turn, maximizes distributor revenues and profits a priori and therefore align incentives between movie

¹² In other words, the cost of the exhibitor effort is small relative to the total exhibition costs, most of which are fixed. The optimal incentive contract will be based on gross profits, which are better approximated by revenues than by net profits in this context.

distribution and exhibition. This section shows the advantages of using revenue sharing for distributors that face a number of exhibitors with different valuations for their movie and maximize profits a priori. The following section yields empirical implication of this our model and argues why revenue sharing is also best among the pricing schemes discussed from an ex-post perspective to maximize profits and minimize ex-post contractual and renegotiation costs.

2.2 Empirical Implications

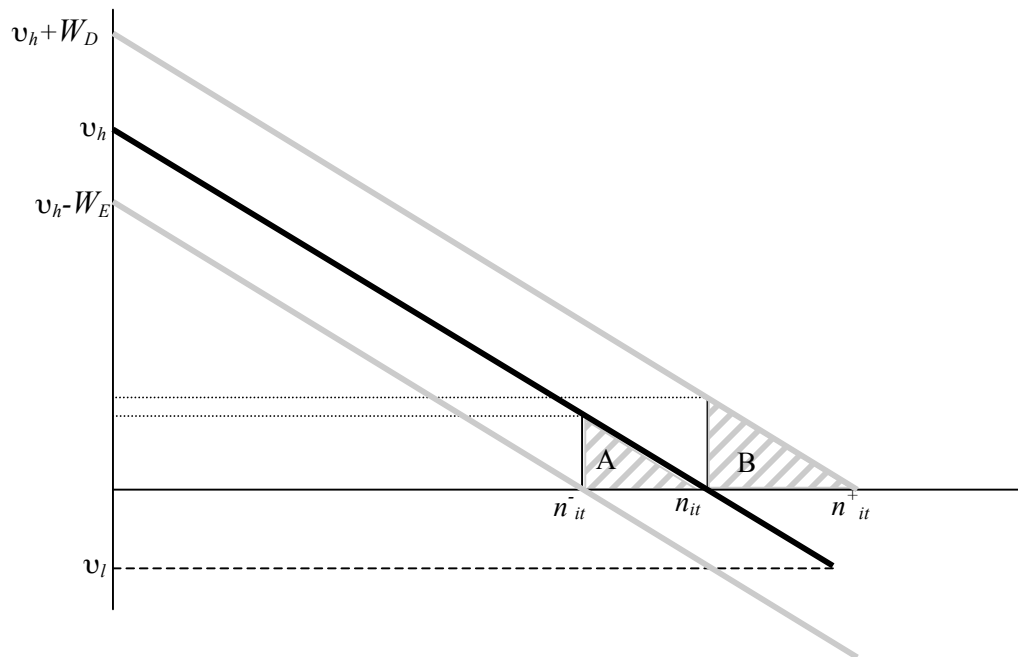
One interesting aspect of our explanation for the use of revenue sharing in this industry is that it can account for an important feature of the contracts that has remained puzzling to date, which is that they do not entail any lump-sum payments. This feature of the contracts is puzzling largely because such fees typically are needed as part of revenue sharing contracts that solve insurance or moral hazard problems, as we discuss further below. However, they would not benefit distributors in our model.¹³ There are two main reasons for this. We discuss these for the case of a weekly fixed fee, but our explanation would also apply to upfront fixed fees.

First, we assumed above that the share of box office contract would be set so as to approximate the value of the movie to the theater, the v_{ij} . In that context, any contract that would add a fixed fee each week, or for that matter a payment by the distributor to the exhibitor, would lead either too few or too many theaters to show the movie. This is illustrated in Figure 1. The thick line represents the downward sloping demand curve across the theaters, which in turn reflects the value of this movie, relative to available alternatives, to each theater. A required fixed payment from the exhibitor to the distributor, or W_E , independent of box office revenues shifts this demand curve downward. While in expectations a contract with such a fixed fee can entail the same total revenue per theater to the distributor, a smaller set of exhibitors ($=n_{it}$) will choose to show the movie under this contract. This will lead to a loss of revenues, and thus profits, of the triangle A for the distributor. Conversely, a weekly fixed fee that would be paid by the distributor ($=W_D$) shifts the demand curve out, such that while the payments per theaters

¹³ Note that revenue sharing contracts for [owner operators in trucking](#), the use of which Lafontaine and Masten (2002) explained also as a price discrimination mechanism, do not normally entail fixed fees either.

that would have chosen to show the movie compensate the distributor fully for this fixed fee. In Figure 1, the shift is sufficient to induce all N theaters to show the movie ($N = n_{it}^+$). But the new theaters that are now induced to show the movie ($= n_{it}^+ - n_{it}$) do not earn enough to make up for the fee paid by the distributor. Again, compared to the case where there is not fixed fee, the distributor will suffer a loss, described by the triangle B. Under either scenario, then, the distributor is worse off than under a contract with no fixed fees.

FIGURE 1: DERIVED DEMAND DOWNSTREAM AND THE EFFECT OF FIXED FEES



The second reason not to have a fixed fee hinges on the existence of ex-post uncertainty and the distributor goal to minimize ex-post renegotiation costs. We assumed above that the r_{ijt} would be set so as to approximate the value of the movie to the theater, the v_{ijt} , which we also argued is related to box office revenues directly. If we add a weekly fixed fee, W , to the payment of the exhibitor, it would have to be that profits of the marginal theater are the same and equal to zero under both scenarios such that

$$(1 - \rho_{ijt}^*) q_{ijt} p_{jt} + \alpha q_{ijt} - C - W = (1 - r_{ijt}^*) q_{ijt} p_{jt} + \alpha q_{ijt} - C = 0$$

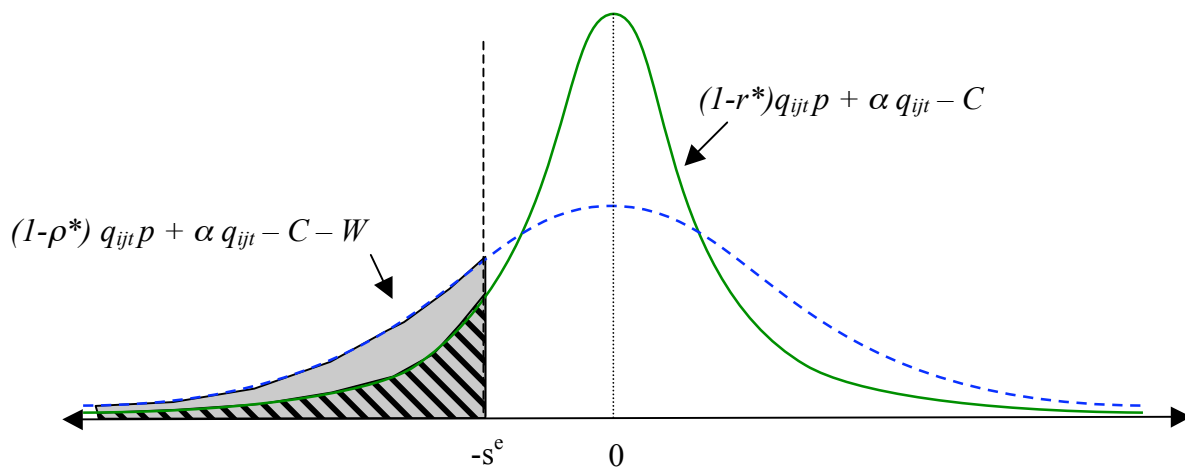
or

$$(r_{ijt}^* - \rho_{ijt}^*) q_{ijt} p_{jt} = W.$$

Thus the new share to the distributor, ρ^* , must be smaller compared to the case with no W 's. This in turn implies that, for any given distribution of movie revenues, the exhibitor revenues ex post will exhibit higher variability while retaining the same expected value. If exhibitors tend to request that the fees be renegotiated when they fall below some threshold, they will do so more frequently under contracts with fixed payments than otherwise. Since there are costs to renegotiating the share for a given week ex-post, say s^e and s^d for the exhibitor and distributor respectively, the inclusion of a fixed fee charged to the theater each week will lead to a higher rate of requested renegotiations, which will reduce the total surplus from the relationship.

Assuming a symmetric movie revenue distribution, we show that the two weekly net revenue functions for the exhibitor in Figure 2. When the exhibitor net revenues are below s^e in this figure, there will be a request to renegotiate payments for that week, and an increased probability that the exhibitor will reevaluate the movie's prospects and pull the movie the following week. As is clear from the figure and areas under the curves, this will occur with greater frequency under a compensation scheme with fixed fees than under the one without such fees. Not surprisingly, given the increased cost of renegotiation ex-post and the lack of benefit in terms of total revenues to the distributors from such fees, the contracts do not include fixed fees.¹⁴

FIGURE 2: MEAN EXHIBITOR PROFITS EX POST AND RENEGOTIATION PROPENSITIES



When share contracts are used to resolve either risk sharing or double-sided moral hazard issues, in contrast, they typically entail fixed lump-sum fees in addition to revenue shares. Under risk sharing, the larger shares of revenues retained by the distributor under high-risk situations – larger shares that are necessary to allocate more risk to this less risk averse party – must be accompanied by some lump-sum fee paid back to the exhibitor for the exhibitor's participation constraint to be satisfied (e.g. Stiglitz, 1974).¹⁵ Similarly, under double-sided moral hazard, Bhattacharyya and Lafontaine (1995) show that an affine contract implements the first-best, but since the share parameter depends on the desired strength of incentives on both sides, a lump-sum transfer is needed to satisfy the agent's participation constraint (see their appendix).

In addition to providing an explanation for the absence of fixed fees in movie exhibition contracts, the notion that sharing can be used as an efficient way to extract rent yields a number of other testable implications that we take to data below.

First, when a distributor sets the share parameter for an especially promising movie, a blockbuster with proven record in the US, our model predicts that she will retain a higher share for herself. Importantly, if such a movie is also less risky, which we argue below is the case, a risk-sharing model where the distributor is the less risk averse party would predict that the distributor need not insure the exhibitor as much if expected revenue is the same. Hence the exhibitor share, rather than the distributor share, would be higher for more successful movies. In the absence of fixed fees, of course, this prediction is troublesome to say the least: it implies that the exhibitor will earn much more from such movies as not only will box office receipts be higher, but his share of these will be higher as well. In our model, the exhibitor share of box office revenues for such movies will simply be lower.

Second, the exhibitor will retain a movie for another week if and only if the returns he expects from the movie are at least as large as what he could obtain under available alternatives. Assuming, as

¹⁴ A similar argument explains why exhibitors should not pay any upfront – or one-time – fee either: this would discourage those theaters whose expected value from showing the movie is relatively low from taking the movie. Being excluded from such theaters only reduces total box office for the movie, and hence distributor revenues.

¹⁵ One reason to assume that distributors are less risk averse than exhibitors is that they distribute their movie in a variety of markets, and thus have more geographically diversified activities, than do the local exhibitors.

per our model above, that C remains constant over time at a given theater, the contracts have to stipulate a decreasing share of box office revenues for the distributor as the attendance for a movie decreases with weeks since release to induce the exhibitor to keep the movie on the screen longer. In other words our model predicts the pattern of decreasing shares with time since release we observe in the data.

Third, for movies that are expected to do well, the share to the distributor should begin at a higher level, go down at a slower pace with weeks since release, and go down to a lower share by the end of the contract, than for other movies. This is because at the time of signing the contract, the parties will forecast that the number of moviegoers will be larger, and will remain so over a longer period, for such movies.

Fourth, despite the lower shares for the exhibitor, our model predicts that blockbuster movies will be kept longer on the screens because the number of moviegoers will remain sufficient to satisfy the exhibitor's participation constraint. On the contrary, under a model with exhibitor moral hazard affecting outcomes at the margin, lower exhibitor shares would induce lower exhibitor effort, which could reduce revenues enough that the movie might be pulled earlier than others.

Finally, our model predicts that movies whose results are below expectations have a higher likelihood of ex-post renegotiation, in the form of higher shares paid to exhibitors, than movies that do at or above expectations. On the contrary, under exhibitor moral hazard, relatively low movie performance at a given theater could be a signal of poor exhibitor effort such that one might expect the distributor to request extra compensation, but certainly not offer more to the exhibitor.

3- The Data

We have access to a unique data set with detailed information on the contracts used in the distribution of 510 movies shown in Spain in up to 96 different theaters between January 2001 and June 2002, for 13,816 different contracts in total. A number of the theaters in these data, however, are owned by movie distributors. Interestingly, when dealing with their own theaters, distributors rely on contracts with the same structure as those used for independents. Since it is less clear what their motivations might be in setting up these contracts, however, we exclude contracts reflecting cases where distributors are dealing with their own theaters from our analyses below. We have verified that our empirical results are

qualitatively the same whether or not we include them. We also exclude a few contracts in our data (965 of them) that do not represent first-run contracts. Our final sample then relates to 430 movies shown in up to 91 theaters in 51 different cities, for a total of 10,167 contracts.¹⁶

Table 1 provides descriptive statistics for our variables of interest, starting with our main dependent variable, distributor share, which we observe at the movie/theater/week level. The next panel describes our movie/theater level data, which correspond to the data we have on a per contract, rather than per week, basis. This includes information on the terms of the contract, namely the maximum and minimum distributor shares stipulated in the contract, along with the number of weeks that these contract terms apply to.¹⁷ We also present here data on the actual run length of the movie per theater, which we have for a subset of our data.¹⁸ Finally, we show distributor share in this panel as well. Comparing the mean here versus that in the panel above reveals that weighing by the number of weeks that each movie is contracted on does not affect the mean distributor share much at all.

In the third panel of Table 1 we summarize those variables that are available at the movie level, namely the box office results of the movie in Spain, as well as whether or not the movie was released in the US, and if so, what its box office results were in the US. We also report the duration of each movie in minutes, and data relating to the timing of the release of each movie, whether it occurs at Christmas or at a time corresponding to another major Holiday, and the “known” value of other movies released at the same time, measured by their total US box office.¹⁹ We report distributor shares again in this panel – relative to panel 2, this gives as much weight to movies shown in fewer theaters as it does to more popular ones shown in several theaters. Consistent with our explanation for these shares, we find that the

¹⁶ Most of our 430 movies are shown in only a subset of theaters, which explains why the total number of contracts is about 10,000 rather than about 40,000.

¹⁷ Note that the minimum number of weeks at maximum share is minus one because one movie in the sample started at a low distributor share and then the share went up after a week. This is a special case where the distributor gave up first week revenues in order to convince exhibitors to show the movie, a Japanese movie that had not been released in the US previously.

¹⁸ These data were collected via major Spanish newspapers for theaters operating in Madrid and Catalonia (see Gil, 2004). Consequently, we only observe run length for those movies in our data that were playing in these theaters.

¹⁹ We use data on all US-released movies that are released in Spain during the period of our sample to create this variable, whether or not we have contract data for the movies in question.

average distributor share is now somewhat lower than in panel 2. Similarly, the maximum share stipulated is lower in this panel, as are the number of weeks contracted on and actual run length.

TABLE 1: DESCRIPTIVE STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
Movie/theater/week Level Data					
Distributor Share	52321	50.08	6.76	30	60
Movie/theater Level Data					
Max Distributor Share	10167	57.58	3.75	30	60
Min Distributor Share	10167	44.02	5.84	30	60
# Weeks Stipulated	10167	5.22	2.83	1	31
# Weeks Between Max and Min Share	10167	3.38	2.08	-1	17
# Weeks at Max Share	10167	1.28	.56	1	10
Actual Run Length	3706	4.16	3.35	1	33
Distributor Share ¹	10167	50.61	3.94	30	60
Movie Level Data					
Spain Box Office (€M)	430	2.27	4.00	.002	30.93
US Release	430	0.63	0.48	0	1
US Box Office (\$M)	269	47.27	61.46	.001	403.71
Movie Duration (in minutes)	430	107.04	16.53	75	186
Released during Christmas week?	430	0.11	0.32	0	1
Released during Other Major Holiday?	430	0.03	0.18	0	1
U.S. Box Office of Concurrent Releases	430	129.65	93.20	0	403.71
Distributor Share ²	430	49.30	3.59	30	60
Max Distributor Share ³	430	55.78	4.51	30	60
Min Distributor Share ³	430	44.65	4.56	30	60
# Weeks Stipulated ³	430	4.30	2.24	1	22
# Weeks Between Max and Min Share ³	430	2.58	1.55	0	8.43
# Weeks at Max Share ³	430	1.18	0.40	1	4
Actual Run Length ³	313	3.66	3.33	1	26
Theater Level Data					
# Screens	91	7.32	3.51	1	17
Exhibitor Market Share (in seats)	91	0.37	0.32	0.02	1
Theater Age	70	6.03	7.66	0	54

¹: The original data are at the movie/theater/week level. The movie/theater level data are generated by averaging across weeks at each theater.

²: The original data are at the movie/theater/week level. The movie level data are generated by first averaging across weeks at a theater, and then across theaters.

³: The original data are at the movie/theater level. The movie level data represent averages across theaters.

Finally, in the last panel of Table 1, we describe our theater level data, which includes information on the size of the theaters (number of screens), exhibitor market share, calculated as the proportion of all the theater seats in the city that are accounted for by the owner of theater i , and the age of each theater.²⁰

Table 1 shows that distributors on average obtain about 50% of all box office revenues. Interestingly, the literature on sharecropping also has revealed a tendency for contracts to involve a 50/50 split. However, while sharecropping contracts typically stipulate this division directly, here it is obtained by having the distributor receive more than 57% of box office revenues on average for the first week or two, and then a lower share of box office revenues in the following weeks, down to an average share of 44% at the end of the predicted run of the movie.

On average, distributors specify shares for about 5 weeks, with a standard deviation of almost 3 weeks. Thus a number of movies in the data are contracted upon with theaters for very short periods of time, basically just a couple of weeks. When we look at the number of weeks stipulated variable in panel 3, where the data are weighted by movies instead of movie/theater, we find a much lower average number of weeks. As mentioned above, this indicates that less popular movies, shown in fewer theaters, are contracted upon for shorter periods of time. Comparing the data at the movie/theater and movie level also reveals that the extra week contracted upon corresponds mostly to a longer time period to go from maximum to minimum distributor share for the more popular movies, not more time at the maximum. This, again, is as predicted by our argument. Finally, the data on realized movie run lengths show that movies last an average of about one month on the screens, but that there is more variance in movie run durations than in stipulated contract periods.²¹ Moreover the actual run lengths are, on average, shorter than the period contracted on. These findings confirm that the contracts are not binding when it comes to keeping movies on screens – exhibitors can pull movies before the end of the period for which terms are

²⁰ Unfortunately, we could only ascertain the construction year for 70 of the 91 theaters in our data.

²¹ Though we know run length only for a subset of our data, we have verified that within the set of 3706 contracts for which we observe this variable, the descriptive statistics for weeks stipulated are similar to those we report for our overall sample. Specifically, at the movie/theater (movie) level, the mean weeks stipulated in the set of 3706 contracts is 5.38 (4.76), with a standard deviation of 3.15 (2.94). For the number of weeks between min and max, these figures are 3.40 (2.76) and 2.10 (1.61) and for the number of weeks at maximum share, they are 1.28 (1.19) and 0.54 (0.41) respectively.

stipulated in the contract. At the same time, some movies remain on screens beyond the number of weeks contracted upon. Typically, the last share stipulated in the contract then applies to all weeks beyond the last week contracted on.²²

Sixty-three percent of movies released in Spain are released first in the US. The movies thus released, however, are shown in more theaters in Spain than non-US released movies, as the proportion of movies released in the US is seventy-three percent when calculated on a movie/theater basis (not shown). The movies released in the US prior to their release in Spain collected an average of \$47 million during their US run. However, there is much variance within this set as well.

As for theater characteristics, the average theater in the sample has 7 screens. Also, on average, exhibitors control about one third of all the seats in their market (city). In some cases (19 % of theaters), however, the owners have 100% of the local capacity. Finally, the majority of the theaters in the data are modern multi-screen theaters (the average theater is 6 years old), but some are quite old (54 years old).

4- Empirical Methodology and Results

In this section, we test the predictions from our model more formally, starting with the effect of movie value on distributor shares and their evolution after release. Recall that our model predicts that distributors will request a larger share of revenues for movies that they expect will do well, and that their share also will decrease more slowly over time and ultimately reach lower levels for movies they expect will generate high box-office revenues. We test these predictions in two steps – first, we show that a movie’s result in the US predicts how well it will do in Spain. In other words, at the time of contracting for the Spanish market, distributors and exhibitors can use US results to form their expectations. We then show that distributors request higher shares, and shares that decrease more slowly, for those movies that they predict will do better in Spain, or, equivalently, for those that generate higher box office outcomes in the US market. We then consider the implications of our model for the frequency and form of renegotiation we find in this industry, and the empirical evidence relating to this aspect of the relationship. Finally, we briefly discuss how these results and others are inconsistent with standard risk-

²² We learned about this and other industry practice from several interviews with industry insiders.

sharing arguments for revenue sharing in this industry, and with explanations relying on double-sided moral hazard as well.

4.1 Predicting Movie Success in Spain

Table 2 shows how useful information about US box office is in predicting Spanish box office figures. The regression results indicate not only that box office figures between the two countries are highly correlated, as per the first two regressions, but that the prediction errors, in proportion to predicted values, are smaller for movies that do better in the US (columns 3 and 4). Interviews with distribution and exhibition managers in Spain confirmed the importance of US market information in their evaluation of the market potential as well as the predictability of movie revenues. First, the managers indicated that they do rely on box office revenues in the US when they forecast revenues in Spain. They also pointed out that they perceive movies that have collected high levels of US box office revenues as less risky than those that collect medium and then low levels of revenues in the US. Finally, managers reported that local or European movies not previously released in the US are the riskiest type of movies that they handle since they do not come to them with a market outcome that they can rely on.²³ Since US release or box office information allows distributors to predict how well movies will do in Spain, our model implies that stipulated distributor shares should be higher for movies that do better in the US.

TABLE 2: PREDICTING SPANISH BOX OFFICE REVENUES

Dep Variable:	Spain Box Office (1)	ln(Spain Box Office) (2)	% Deviation from (1)	% Deviation from (2)
US Box Office	0.06*** (0.003)		-0.01*** (0.002)	
ln(US Box Office)		0.61*** (0.04)		-0.01*** (0.002)
Constant	0.11 (0.20)	3.59*** (0.72)	1.16*** (0.10)	0.31*** (0.04)
Observations	269	269	269	269
R-squared	0.68	0.43	0.03	0.12

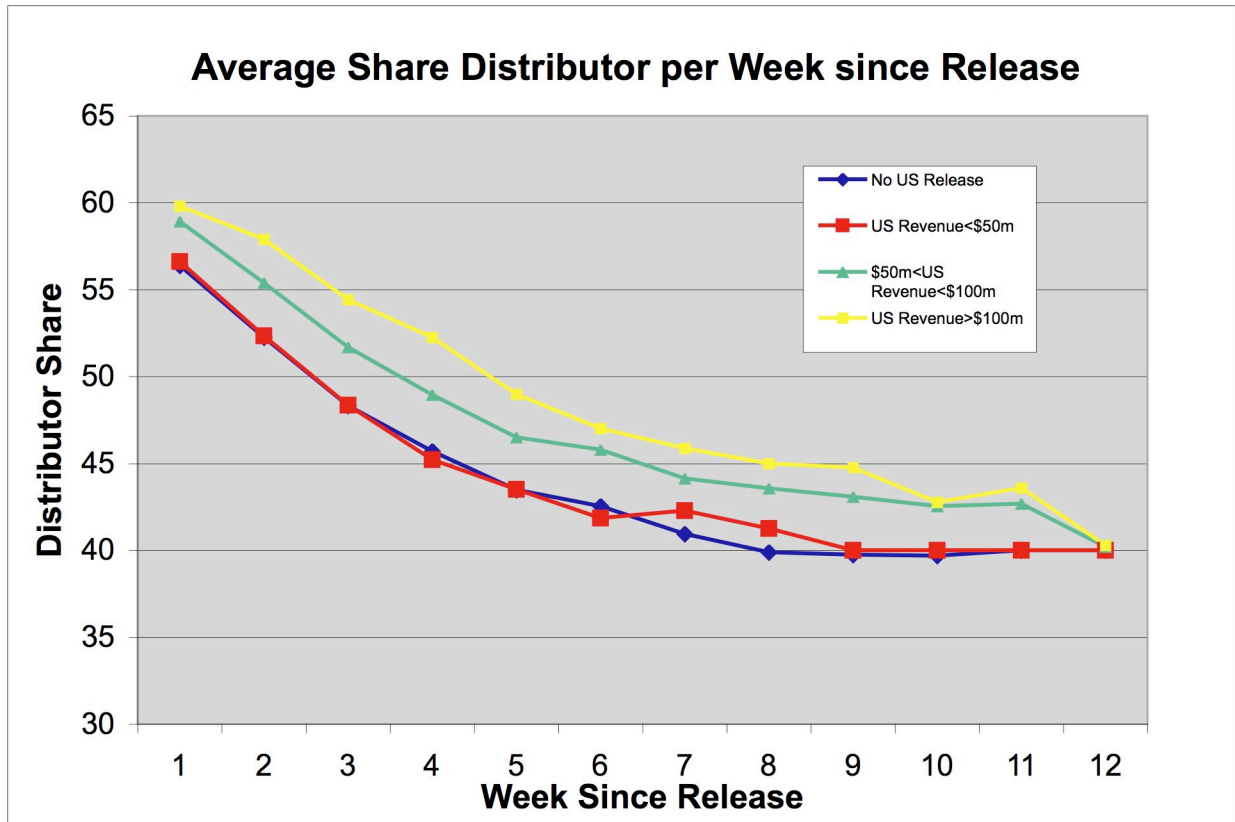
Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

²³ Spanish movies are always released first in Spain, except for “The Others,” a Spanish production starring Nicole Kidman. For other European movies, while they might have been released and become hits in their own countries, wide cultural and historical differences between European countries make it difficult to make inferences about success in another European country based on domestic outcomes.

4.2 Distributor Shares and Movie Success in Spain

Figure 2 shows how distributor shares change over weeks since release for different categories of movies, where the categories are defined using box office outcomes in the US. This figure illustrates two important patterns, both of which are consistent with our predictions. First, even though only more successful movies are contracted upon for long enough periods of time to appear in the latter portion of the figure, average distributor shares still are systematically lower for all categories of movies the longer the time since release. Second, Figure 2 shows that distributors obtain a larger share of revenues for more successful movies. More specifically, average distributor shares are greatest for the set of movies that did best in the US, followed by those that did between \$50M and \$100M in the US. Movies that did relatively poorly in the US, namely those that obtained less than \$50 million in box office there, and non-US released movies are contracted upon using very similar shares on average.

FIGURE 2



One potential explanation for the patterns in Figure 2 that we can rule out is that distributors of non-US released movies may be smaller firms, and hence more likely to be risk averse, than the distributors of the blockbusters. While not shown in the figure, we find the same patterns in distributor shares after controlling for distributor fixed effects – in other words, even within distributors, blockbusters command larger distributor shares than non-US released movies, but the distributor shares are the same for movies that did relatively poorly in the US and those that were never released there.²⁴

We explore the relationship between distributor share and movie success in more detail in Table 3, where we show how distributor shares stipulated in the contract relate to US box office outcomes, and how they change with weeks since release. In this table, we first show results obtained when we do not control for any fixed effects, followed by results with theater fixed effects, and then theater and calendar week specific effects, and finally theater, week and week since release fixed effects. We also control for movie length, in minutes, under the assumption that the length of the movie also might affect its pricing.

The results in Table 3 are quite consistent across our specifications. Thus the patterns we show in the distributor shares and how they relate to a movie's popularity are unaffected by seasonality effects and theater characteristics. They are also very consistent with the predictions from our model. In all specifications, the coefficient on (log) US box office is such that movies need achieve only very modest results in the US, \$16M to \$18M in box office revenues, for the distributor shares in the contract to be higher than those on non-US released movies. In other words, even very modest results in the US undo the negative “intercept” effect of US release in our regressions.²⁵ This explains why movies that performed relatively poorly in the US, obtaining results around \$17M on average in that market, show shares that are so similar to those of non-US released films in Figure 2.

The results in Table 3 also confirm that distributor shares decline less rapidly over time since release for more popular movies. While the distributor share declines by more than two percentage points

²⁴Movies not released in the US average 1.13 million Euros versus 1.16 million Euros for movies that were released in the US but collected less than \$50 million in box office. These means are not statistically different from one another, but the standard deviation in box office results is statistically greater for movies not previously released in the US.

²⁵ For example, in column 1, $\exp(3.14/1.13) = 16.1$.

TABLE 3: DISTRIBUTOR SHARES PER MOVIE/THEATER/WEEK

Independent Variable:	(1)	(2)	(3)	(4)	(5)
US Release	-3.14*** (0.75)	-3.16*** (0.75)	-2.73*** (0.75)	-2.68*** (0.75)	-2.10*** (0.75)
Ln[1+US Box Office]	1.13*** (0.19)	1.11*** (0.19)	0.95*** (0.19)	0.94*** (0.21)	0.69*** (0.23)
Standard Deviation of Forecast Error					-0.98 (0.66)
Week Since Release	-2.16*** (0.10)	-2.18*** (0.10)	-2.13*** (0.09)		
Week Since Release*US Box Office	0.003*** (0.000)	0.003*** (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.004*** (0.001)
Christmas Week	0.69 (0.84)	0.72 (0.84)			
Other Holiday Week	-0.06 (0.26)	-0.05 (0.26)			
Ln[1+U.S. Box Office of Concurrent Releases]	-0.21** (0.10)	-0.21** (0.10)	-1.03*** (0.16)	-0.22 (0.19)	0.27 (0.19)
Movie Duration (in minutes)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.02** (0.01)	0.02** (0.01)
Constant	56.15*** (1.63)	56.31*** (1.61)	59.94*** (1.72)	43.86*** (1.57)	45.24*** (1.87)
Theater FE	No	Yes	No	No	No
Week-Theater FE	No	No	Yes	No	No
Week-Theater-Week since Release FE	No	No	No	Yes	Yes
Observations	52321	52321	52321	52321	52321
R-squared	0.56	0.56	0.61	0.86	0.86

Robust standard errors, clustered at the movie level, in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

each week, per the coefficient on weeks since release, the positive interaction effect between US box office and week since release implies that every 10 million dollars of US box office reduces the weekly decline in distributor share by 0.03 percentage points, or 1.39% ($100 * 0.03/2.16$) based on results in column 1.

Results shown in the first two columns of Table 3, where we do not control for seasonality using fixed effects, allow us also to examine the effect of high demand, usually associated with major Holidays, where we separate Christmas from other Holidays, and the effect of the “importance” of concurrent releases (measured by the US box office results of those that were released in the US) on distributor shares. We find no effect of Holidays, but lower distributor shares for movies released simultaneously

with many other US box office hits.²⁶ The latter result suggests that competition among distributors leads to higher shares being offered to exhibitors in weeks with many other valuable alternatives. Finally, we find that distributor shares are higher for longer movies, though this effect is only significant in specifications with theater-week-week since release fixed effects. One could have predicted the opposite as very long movies cannot be shown as often and thus could yield lower box office results. However, it is likely that long movies tend to be good, or put differently good movies can afford to be long, and thus our results on movie length in fact confirm that high quality movies imply higher distributor shares. In any case, our other results above remain the same when we exclude movie duration from our regressions.

In the last column of Table 3, we add one other variable, “Standard Deviation of Forecast Error,” to our most flexible specification, with theater-week-week since release fixed effects. This variable is defined as the standard deviation of the forecast error for the group of movies that achieved similar box office outcomes in the US, where the groups are formed by dividing US box office results into 10 size categories, and the forecast errors are obtained from the regression in column 2 of Table 2. We created also an eleventh group by combining all the movies not previously released in the US, and using the deviation of their results from the mean results of the group as our measure. We find no relationship between the standard deviation of forecast error and distributor share, a result we view as inconsistent with the risk-sharing explanation for these contracts as it would predict higher distributor shares for riskier movies.²⁷

In Table 4 we shun the use of theater fixed effects to explore how theater characteristics affect distributor and exhibitor shares. Recall that our model is based on the idea that the share to the exhibitor cannot extract more than v_{ijt} . This has two main implications when it comes to theater characteristics: first, since we expect that older theaters are more costly to run, we expect them to obtain higher shares. Second, we expect the exhibitor will have better outside opportunities, and thus be able to obtain a higher

²⁶ We verified that in our data, box office revenues are higher during the weeks we identify as major holiday weeks.

²⁷ We also considered how movie genre might affect observed shares, under the presumption for example that some genres may be more risky generally than others (i.e. box office outcomes may be less predictable for science fiction movies than for, say, mainstream comedies). In no case were movie genre fixed effects significant as a group in our regressions if we included other types of fixed effects. Moreover, their inclusion did not affect any of the results above.

share, the larger the theater is – as captured by the number of screens – and the larger the exhibitor’s share of the local exhibition market.

TABLE 4: DISTRIBUTOR SHARES PER MOVIE/THEATER/WEEK

Independent Variables:	(1)	(2)	(3)
US Release	-3.13*** (0.75)	-4.19*** (0.80)	-4.06*** (0.84)
Ln[1+US Box Office]	1.10*** (0.19)	1.56*** (0.19)	1.55*** (0.20)
Week Since Release	-2.14*** (0.10)		
Week Since Release*US Box Office	0.002*** (0.001)	0.0005 (0.0005)	0.0003 (0.0004)
Theater Age	-0.03** (0.02)	-0.08*** (0.01)	-0.08*** (0.01)
Screens	-0.02 (0.02)	-0.05*** (0.01)	-0.04*** (0.01)
Exhibitor Market Share	-0.21** (0.10)	-0.15* (0.09)	-0.15* (0.09)
Christmas Week	0.75 (0.83)	1.15*** (0.94)	
Other Holiday Week	-0.07 (0.26)	-0.02 (0.25)	
Ln[1+U.S. Box Office of Concurrent Releases]	-0.23** (0.10)	-0.07 (0.09)	-0.29* (0.16)
Movie Duration (minutes)	0.01 (0.01)	0.02 (0.01)	0.02 (0.01)
Constant	56.64*** (1.62)	46.89*** (1.5)	53.70*** (1.75)
Week since Release Fixed Effects	No	Yes	Yes
Week Fixed Effects	No	No	Yes
Observations	46427	46427	46427
R-squared	0.55	0.66	0.67

Robust standard errors, clustered at the movie level, in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Results in Table 4 support the predictions above. First, a theater’s age has the expected negative effect on distributor share, that is older theaters get larger shares of box office revenue. Distributors also get lower shares when dealing with larger theaters and/or exhibitors with larger market shares. Finally, consistent with the fact that theater fixed effects did not alter the conclusions we reached relative to US box office success in Table 3, our results also are robust to replacing these fixed effects by theater characteristics.

In Table 5, we show how the maximum and minimum distributor shares stipulated in the contract, the number of weeks the contract covers, and the number of weeks that the movie actually runs all relate

to the predicted success of the movie, as captured by US release and US box office revenues. The results imply that contracts for higher US box-office movies have higher maximum distributor shares but also a lower minimum. They also involve sharing terms for a greater number of weeks than contracts of movies that were not as successful in their US run. The last two columns show that even though the distributor keeps a higher share of the revenues for a longer period, exhibitors choose to keep the higher US box office movies running longer – given high Spanish attendance for these, it is profitable for exhibitors to keep showing them despite the more adverse contract terms.

TABLE 5: MOVIE/THEATER CONTRACT TERMS

	Max Share		Min Share		Weeks Contracted		Actual Run Length	
US Release	-2.60*** (0.70)	-2.18*** (0.80)	0.66 (0.81)	1.65** (0.69)	-2.48*** (0.43)	-1.94*** (0.35)	-2.95*** (0.61)	-2.53*** (0.48)
Ln[1+US Box Office]	1.09*** (0.13)	1.06*** (0.23)	-0.32* (0.19)	-0.73*** (0.20)	0.96*** (0.12)	0.79*** (0.11)	1.11*** (0.18)	1.02*** (0.15)
Theater Age	-0.09*** (0.01)		0.19*** (0.02)		-0.07*** (0.01)		0.04*** (0.01)	
Screens	-0.05** (0.02)		-0.10*** (0.02)		0.07*** (0.01)		0.15*** (0.02)	
Exhibitor Market Share	-0.25** (0.13)	0.21 (0.44)	1.19*** (0.18)	-0.35 (0.90)	-0.65*** (0.07)	0.05 (0.48)	-0.58*** (0.11)	-0.32 (0.46)
Christmas Week	0.45 (0.83)		0.18 (0.69)		1.29* (0.79)		1.17 (1.47)	
Other Holiday Week	0.81** (0.41)		-0.85* (0.49)		0.45* (0.28)		0.59 (0.57)	
Ln[1+U.S. Box Office of Concurrent Releases]	-0.02 (0.12)	0.07 (0.29)	-0.12 (0.18)	-0.76** (0.30)	-0.04 (0.08)	-0.22 (0.16)	-0.14 (0.14)	-0.34*** (0.25)
Constant	57.49** (0.76)	56.53*** (2.15)	44.63*** (0.95)	41.89*** (3.27)	4.45*** (0.44)	5.10*** (0.93)	2.37*** (0.71)	0.63 (0.49)
Movie-Release Week FE	No	Yes	No	Yes	No	Yes	No	Yes
Theater FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	9110	10167	9110	10167	9110	10167	3472	3706
R-Squared	0.15	0.27	0.04	0.47	0.19	0.42	0.18	0.45

Robust standard errors, clustered at the movie level, in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Results from Table 5 also show that distributor maximum shares are lower, and minimum shares higher, when movies are shown in newer theaters that are run by exhibitors with lower market shares of seats, and when they are released during Holiday weeks other than Christmas. The number of screens in a theater, however, increases both maximum and minimum distributor shares, and it increases the number of weeks that a movie stays on the screen. This suggests that theaters with more screens are better able to

move the movie from larger to smaller screen over time, thereby making it profitable to keep the movie longer. We find that older theaters contract for fewer weeks, but keep movies longer on their screens. Finally, movies released during holiday weeks or Christmas are contracted upon for longer and kept longer on the screen, but exhibitors with large market shares in their local market tend to contract for shorter periods and keep movies for fewer week. Most important, however, the results in this table further confirm that movies with even modest outcomes in the US (>\$8 to 14M depending on the specification) have higher (lower) max (min) shares, are contracted upon for longer periods of time, and are kept on the screen longer than non-US released movies.

4.3 Movie Results and Ex-post Compensation

We have argued that movie revenues in a given week at a given theater are uncertain, for distributors and exhibitors, at the time contracts are negotiated. We have also argued that the share parameters in the exhibition contract will be chosen to keep the exhibitor at or near their participation constraint. Assuming that the distributor indeed chooses terms that keep the exhibitor very near this constraint, on average the exhibitor will earn about zero economic profits. Equivalently, the monopolist successfully achieves first-degree price discrimination and thus extracts all of the theaters' willingness to pay. Of course in any given week, the revenues may be above or below expectations. But if the contracts are such that the exhibitor rarely obtains large positive returns, the exhibitor will not tolerate many negative outcomes either.

It is standard practice in the industry for distributors to pay exhibitors when movie revenues are unexpectedly low for a given week.²⁸ Although accounts are reviewed and settled only at the end of the movie's run, industry insiders point out that distributors can easily identify the weeks for which they will get such requests, and the likely amounts, as they observe the weekly results for their movies.

²⁸ Kenney and Klein (1983) similarly note that, in the context of the diamond industry, the CSO offers a "warranty" to diamond dealers who purchase their packets by promising that gross classification "mistakes" will be corrected. We expect that such corrections occur much more often in our context because exhibitors do not earn much rent, while Kenney and Klein suggest that dealers in the diamond industry earn significant amounts of rent.

In a sample of roughly 19,000 theater/movie/week observations, Gil (2004) finds that distributors agreed to pay extra monies to exhibitors one out of every two weeks on average. In no case did they renegotiate in favor of the distributor. In other words, it is because the participation constraint of the exhibitor is not satisfied, and never because of problems with distributor compensation, that the parties find they need to renegotiate. We believe that this is because distributors are quite aggressive in setting the terms of the contract. Specifically, while they try to write a pricing formula that often works well, the distributors' desire to extract most of the downstream profits leads them to offer terms that barely satisfy the exhibitors and cover their costs, leading to frequent requests for financial adjustments. This in turn suggests that the cost of settling on these additional transfers is not high. For one thing, as described above, this negotiation occurs only once, at the end of the movie's run, which keeps the cost of settling the accounts down. Also, both parties recognize the value of their future relationship. Consequently, the firms agree to new terms fairly quickly. Industry participants note that firms sometimes disagree and retaliation can occur, but this remains quite rare.

Our model predicts that these renegotiations in favor of the exhibitor will occur more often for movies that achieve below expectations results. We therefore relate the incidence of renegotiation for individual movies per theater run, as captured by the proportion of weeks within each run for which renegotiation occurs, to our US release and US box office return data to see if movies that are predicted to do well are renegotiated less frequently than others. Because our renegotiation data are from a different source, we can measure this incidence only for 274 of our 430 movies, and in 25 theaters, for a total of 2844 theater-movie pairs. We also rely on "deviation from expected outcome," measured by the error terms from our earlier regression, in Table 2, to capture the effect of a movie meeting expectations or not. For non-US released movies, we rely on the deviation of actual box office from the average box office of all non-US released movies to capture the same idea. Thus a large negative "deviation" is an indication that a movie has underperformed relative to expectations, where these expectations are based either on US outcomes or on average outcomes for similar movies in Spain.

Results from our analyses on renegotiation are shown in Table 6. Consistent with our prediction, we find first that the incidence of renegotiation is lower for movies that have been released in the US, and for movies that achieve higher box office results in the US as well. As we have argued above, parties have better indicators of likely success in Spain when they negotiate the contracts for these movies, such that renegotiation should be less frequent for these. We also find that renegotiation occurs much less frequently for movies that exceed expectations, even after controlling for US release and/or US box office revenues. In particular, outcomes for movies that exceed expectations by 3 million Euros are 10 percentage points less likely to be renegotiated.²⁹ These results are robust to the inclusion of theater and week release fixed effects (see columns 4 and 5).

TABLE 6. RENEGOTIATION

	(1)	(2)	(3)	(4)	(5)
US Release	-0.19*** (0.06)	-0.14** (0.07)	-0.16** (0.07)	-0.16** (0.07)	-0.12* (0.07)
US Box Office (\$M)		-0.001* (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.001** (0.000)
Deviation From Expected Revenue (€M)			-0.03*** (0.007)	-0.03*** (0.007)	-0.03*** (0.007)
Constant	0.73*** (0.05)	0.73*** (0.05)	0.76*** (0.05)	0.76*** (0.05)	0.80*** (0.05)
Theater Fixed Effects	No	No	No	Yes	Yes
Week Fixed Effects	No	No	No	No	Yes
Observations	2844	2844	2844	2844	2844
R-squared	0.03	0.04	0.09	0.11	0.35

Standard errors, clustered at the movie level, in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

We conclude that the goal of maximizing distributor profits while at the same time minimizing the sum of contract negotiation and renegotiation costs leads to contracting practices that remain flexible in the sense that further payments by distributors to exhibitors will be forthcoming if the terms agreed upon do not provide sufficient returns to exhibitors. Still, box-office revenue sharing allows the parties to

²⁹ Note that the intercept for the regression results in Table 6 is high, at .73 or more, relative to what one might expect if only half the outcomes are renegotiated. The reason for this is that in these regressions we weigh less popular movies, which are shown in fewer theaters over fewer weeks but are much more likely to require renegotiation, as much as we do more popular movies, shown longer periods and on more screens but whose terms are much less often renegotiated.

these contracts to rely on the contracts themselves for about half the outcomes, renegotiating only once per movie/theater – at the end of the run – for the other half of the outcomes.

4.4 Revisiting Risk-Sharing and Double-Sided Moral Hazard

Some of the results we presented above could be interpreted as providing support for the risk-sharing explanation for share contracts in movie distribution (e.g. Filson et al, 2004). For example, assuming that exhibitors are the more risk-averse parties, exhibitors with larger theaters would likely be less risk averse than other exhibitors. The fact that they obtain larger shares than other exhibitors is consistent with the idea that the contract shares the risks optimally between the two parties. Similarly, exhibitors with higher market share in a given market will be less risk averse than others with lower shares because they are able to diversify across more theaters and more movies. The fact that they obtain larger shares than smaller exhibitors is also consistent with the risk-sharing explanation.

These results, however, are also consistent with our explanation. On the other hand, if high US box office movies are less risky, as we argued above, because of the information available about them and the resulting ease of forming expectations, distributors should offer higher shares of these movies' box office to their risk-averse exhibitors. In fact, we find just the opposite. Moreover, since non-US release movies are riskier, according to industry participants, than even “low success” US-released movies, the risk sharing argument would imply that the share to distributors would be greatest for these. The data in Figure 2 and our regression results contradict this prediction. Furthermore, as noted in our discussion of Table 3 results, we find no evidence that distributors get higher shares of movies in higher forecast error groups, as efficient risk-sharing would suggest. Finally, it is clear from our renegotiation results that exhibitor shares are renegotiated much more often for movies that achieve lower results than expected. Given this practice of compensating exhibitor in such cases, it is difficult to argue that exhibitors need insurance – they face very little risk in reality if they always have the option of requesting extra compensation. For all these reasons, we conclude that risk-sharing is not a satisfactory explanation for the reliance on box office share contracts in movie distribution.

There are several problems with explanations that emphasize moral hazard issues as well in the current context.³⁰ As argued above, the systematic absence of fixed fees in our view challenges the validity of incentive arguments as well as risk sharing arguments. But also, most of the costs borne by exhibitors and distributors are fixed or sunk at the time the movie is released. Even movie-specific decisions on the level of advertising and promotional activities are made – and much, if not all, of the expenses already incurred – before the movie is released.³¹ The idea that the contracts are meant mostly to give parties incentives to put forth the right level of ongoing marginal effort when such effort is *de minimus*, to say the least, is simply not plausible.

Finally, it is important to note also that there is not any systematic decrease in distributor, and systematic increase in exhibitor, effort required that would justify the patterns of systematic change in sharing terms we see over weeks since release in these contracts, nor is there an obvious reduction in relative effort for the exhibitor say during Holidays that would justify reducing their shares at those times. Our simple price discrimination explanation, on the other hand, accounts for all of these patterns in the share data.

5. Conclusion

In this paper we have explained the use of box-office revenue sharing in movie exhibition contracts as a simple formulaic way to devise flexible weekly rental prices for movies, where the contract is meant to extract most of the downstream surplus in the presence of ex-ante and ex-post uncertainty. We also have shown that this price discrimination argument captures several important features of these contracts. In particular, we find that distributors retain higher shares for themselves, and that their share goes down more slowly over weeks since release for movies that are expected to do well in the Spanish market. Despite this, the movies are kept longer on the screens given that the number of moviegoers remains sufficient to satisfy the exhibitor's participation constraint even with their lower shares of

³⁰ See Stiglitz (1974) and Holmstrom (1979) on the traditional agency model, and Reid (1976), Rubin (1978), Eswaran and Kotwal (1986) and Bhattacharyya and Lafontaine (1995) on double-sided moral hazard.

³¹ It is only on very exceptional occasions that such decisions are made or revised during the movie's theatrical run. Filson et al (2004) also argue against double-sided moral hazard as an explanation for the form of movie exhibition contracts on the basis of a lack of effort needed by the two parties after the movie is released.

revenues. We also found that exhibitors with higher market share of seats obtain higher shares of revenue holding everything else constant, as one would if such exhibitors have better options (higher opportunity cost of showing a given movie or more bargaining power). Finally, we discussed how additional payments are used regularly to compensate exhibitors for below-expectation outcomes, which is again consistent with the idea that the share contracts represent a formulaic way for setting flexible rental prices for the movies that extract almost all the willingness to pay of exhibitors.

We believe that risk-sharing and incentive arguments cannot explain several aspects of the contracting practices in this setting, including the absence of fixed fees, the tendency for contract terms of movies whose outcome are more predictable to be transacted at the same terms as more risky movies, and the one-sidedness of the renegotiations that occur in this industry.

Without denying the importance of incentives in other settings, we expect that our argument that revenue sharing can be a way to achieve flexible pricing applies also in other contexts, including other parts of movie production and distribution, but also potentially in settings such as publisher/author relations, mall leases, franchising and licensing. In fact, Lafontaine and Masten (2002) use a similar argument to explain revenue sharing in carrier/driver relations, and Cachon and Larivière (2005)'s conclusion that revenue sharing better coordinates the video rental channel, as well as Mortimer's (2006) result that video stores, distributors and consumers do better under revenue sharing, also fundamentally amount to the idea that these contracts lead to "better" prices between channel members, prices that then lead to the right choices of quantity (here, weeks on the screen).

The extent to which costs are sunk in the movie industry makes it an especially good candidate for the use of revenue sharing as a flexible pricing mechanism. In particular, the fact that the actions that determine the value of the movie have all been taken by the time revenues are realized dampens the negative incentive effects that revenue sharing could have in other contexts. In other words, when costs are sunk, the goals of contracting parties are mostly aligned whether they maximize their share of, or total, revenues.

We hope that the argument put forward here, and the evidence supporting it, will help advance not only our understanding of the movie distribution industry, but also of share contracting more generally beyond the standard risk-sharing and incentive arguments that are now common in the literature, and that themselves replaced the initial notion that share contracts were by definition wasteful and a reflection of poorly functioning market institutions.

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