

The Role of Revenue Sharing in Movie Exhibition Contracts

Ricard Gil

HBS and UC-Santa Cruz

and

Francine Lafontaine

University of Michigan

Preliminary and Incomplete – Please do not quote – Comments welcome

December 2006

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 argument for revenue sharing in the 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, which may or may not be combined with bonuses, are the norm in most employment relationships. On the other hand, 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 or even typically share in their firm's profits. Sharing also occurs between firms, in, for example, 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 real estate leasing to owner-operator contracts in the US trucking industry. Interestingly, sharing is especially ubiquitous in the movie industry where we see talent being paid a share of revenues or profits (see Chisholm, 1997), 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 rental stores (Mortimer, 2004; Cachon and Larivière, 2005).

The literature on share contracts in economics has evolved from its early days, when authors decried the existence of such backward institutions as sharecropping. Development economists at the time saw these arrangements as backward given their detrimental effects on marginal incentives. In a well-functioning market, they reasoned, such contracts would disappear in favor of single price contracts yielding first-best solutions (see notably 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 (e.g. Stiglitz (1974) and Holmstrom (1979)). Soon thereafter Reid (1976) and Rubin (1978) suggested instead that these contracts solved incentive problems on both sides of the equation, for principal and agent. Eswaran and Kotwal (1986) formalized Reid's argument, and Bhattacharyya and

Lafontaine (1995) showed how the uniform and stable share parameters often observed in practice in franchise and other contracts could easily arise under two-sided moral hazard.

In this paper, we consider yet another explanation that we believe accounts for the ubiquity of share contracts especially in the movie industry but also in other settings. Our work builds on arguments in Mortimer (2004) and Cachon and Larivière (2005) to emphasize the role of uncertainty – as opposed to risk – as the fundamental reason for the widespread reliance on share contracts in this industry. Specifically, we argue that it is the 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 simply to capture most of the willingness to pay of the parties they contract with. From an agency theory perspective this explanation emphasizes the parties’ participation 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, revenue sharing arises as a way to minimize the sum of the cost of designing contracts ex-ante and renegotiation costs ex-post.¹

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. In that sense they represent a stable organizational feature of this industry that deserves attention. Second, contrary to most other contexts considered to date in the literature, these contracts do not simply stipulate the same affine sharing rules to be applied to many transactions, but instead are theater and movie specific, and the stipulated shares decrease at more or less rapid rates over time. Moreover, these share contracts do not involve any fixed fees, contrary to so many such contracts. In other words, these contracts differ in important ways from those used in other contexts, and understanding why this is the case is therefore of particular interest. Third, this industry is

¹ In this sense, our work relates to Barzel (1982) and to 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.

characterized by costs of production and distribution that are basically all fixed and/or sunk. This in turn has implications as to the incentive effects of revenue sharing, and, we believe, explains the important role of share contracts in the movie production and distribution industries generally. 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 in this setting, and conclude that risk sharing best explains the form of the contracts. Our data allow us to reconsider the issue of risk-sharing specifically as described further below.

Our empirical analyses make use of a unique data set with detailed information on 10167 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. Because Spanish industry members use US box office results in forming their 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.² Assuming, as per Filson et al. (2004) and others in the literature, that exhibitors are more risk averse than distributors, an optimal risk-sharing contract then 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 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, our explanation

² We obtained this information through a series of personal interviews with industry insiders in Spain.

sheds light on why firms do not charge fixed fees in this industry, a feature of these contracts that remains puzzling under both risk-sharing and moral-hazard arguments.

The paper is organized as follows. In the next section, we introduce our framework and model the incentives of agents in the motion picture industry. We also present the testable implications of our model. We describe our data in section 3, followed, in Section 4, by our empirical methodology and results. Section 5 concludes.

2- Framework and Model

In his study of the evolution of contracting practices in the movie distribution industry, Hanssen (2002) argues that share contracts became the norm in the industry with the advent of sound. He notes that 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, and this, 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 made possible by the fact that distributors already had in place a means of observing individual movie revenues in each theater.

Mortimer (2004) and Cachon and Larivière (2005) discuss the emergence of sharing in the video rental industry. They note that such contracts arose when distributors found a mechanism allowing them 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 distributors choose or preferred to organize their transactions under such contracts. We develop a very simple model that we believe captures the main features of the industry that affect this decision, and the main motivation behind the use of revenue sharing in this industry.

2.1 The Model

Assume a monopolist who sells his product to a large number of buyers. The costs of production are all incurred prior to sales, so that the cost of selling to one more customer is basically zero. To focus on our optimal pricing argument rather than risk-sharing, we assume that the monopolist and its buyers are risk neutral. In that context, the monopolist will simply maximize its revenues. Finally, assume that buyers each buy (or, equivalently rent) 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.

Now consider the sources of differences in customer valuations in our particular setting. Buyers in our context are movie theaters that purchase the right to show a movie on a screen for a certain time period. 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 nor do they need to be identical for all theaters showing the same movie.³ Instead, 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 renegotiation costs. Since most movies stay on the same screen for a number of weeks, they save on such costs first by setting the terms for several "weeks" together in a single contract. In other words, they "bundle" weeks.⁴ However, as they know that movie revenues go down in relatively predictable ways with weeks since release, the parties do not apply the same "average" share parameter (or average price)

³ 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.

⁴ 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.

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, regardless of the contract terms agreed upon for box office revenue, the exhibitor retains full residual claimancy over concession profits. We do not attempt to explain this fact within our model, but rather take it as given. We suspect this is one area where incentive issues play a central role. In other words, 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.⁵ Note that although one might think of concession sales as 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).

Third, exhibitors set movie ticket prices.⁶ Theaters moreover do not change the price to moviegoers 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 price really is exogenously determined in this industry.

Fourth, exhibitors, not distributors, decide how long to keep a movie on their screen.⁷ 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). At the same time, there is an understanding that the exhibitor can always request additional compensation if attendance levels are below expectations in a given week. This, in turn, implies that theaters will not pull the movie as early as they might if the

⁵ 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.

⁶ 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.

⁷ 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.

contract terms were applied rigidly without concern for outcomes. Of course, distributors would have no reason to really make these side payments were it not for their desire to do business with the same theaters in the future. Thus the “shadow of the future” plays an important role in the functioning of this market. Finally, it is also important to recognize that while the actual amounts to be paid are settled only at the end of the movie’s run in a given theater, the parties negotiate additional compensation levels for specific weeks. Hence the relevant transaction that is priced in the contract, and for which renegotiation may occur, is at the movie-theater-week level.

Taking these institutional features as given, suppose that local demand for movie i in week t at theater j is given by:

$$q_{ijt} = q_{ijt}(p_j)$$

where p_j is the price of a movie ticket at theater j and q_{ijt} is the number of tickets sold for movie i in week t at the same theater. The function q_{ijt} depends on local demand, and thus local population, income and so on, as well as other market characteristics such as exhibitor competition. Of course it also depends on movie characteristics, including movie quality and time since release.

If theater j paid a fixed price M_{ijt} , set in advance, for the right to show movie i in week t , he would choose to show the movie only if

$$\pi_{ijt} = (q_{ijt}(p_j)) p_j + S(q_{ijt}) - C_{ijt}(\cdot) - M_{ijt} \geq 0$$

where $C_{ijt}(\cdot)$ is the cost of showing this movie that week in that theater – which we purposely leave vague for the moment – and $S(q_{ijt})$ are concession profits. Assuming that movie exhibition is a fairly competitive industry, the distributor (and exhibitor) that would observe q_{ijt} , $S(q_{ijt})$ and $C_{ijt}(\cdot)$ perfectly could set the fee for the movie in that theater that week to extract all downstream surplus, that is:

$$M_{ijt} = (q_{ijt}(p_j)) p_j + S(q_{ijt}) - C_{ijt}(\cdot)$$

and leave the (by assumption risk neutral) theater with zero economic profit.

The difficulty with implementing this solution is that it requires that the distributor and exhibitor know and agree on $q_{ijt}(p_j)$, $S(q_{ijt})$ and $C_{ijt}(\cdot)$ at the time of contracting. In reality, it is difficult to predict demand in a given market in any given week for any particular movie, and the cost of showing a movie in

a given week in a certain theater also depends on what this particular theater is giving up by doing so. This in turn depends on what other movies are available and what levels of demand – and concession sales – might be achieved by those movies at that theater in that week, as well as on the terms of the contract that theater would then operate under. In other words, both demand and costs conditions are unknown to both parties at the time they negotiate their contract, which typically occurs weeks before the actual release of the movie.

With risk neutrality, if the distributor and exhibitor both could observe demand and costs up to some random term with known distribution, they could agree in advance to a series of M_{ijt} , or simply set a price M_i (the fee for a copy of this movie that the theater could then use as long as it wishes), or even set an average price per movie M at the expected value of showing movies on screens.⁸ 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. Over the course of several months or years, and thus a large number of movies, both firms could make up these differences on the overall set of movies and contracting parties that they work with. In other words, in expectation, the exhibitors would earn enough to satisfy their participation constraint, and the distributors would earn monopoly profits.

There are many problems with this solution when applied to differentiated movies that depreciate at different rates over time in different markets, however. For one thing, while the number of movies shown on a screen in a year is not small, it is also not so large that exhibitors could count on the law of large numbers to make up differences in movie appeal, especially when movie appeal can vary as much as it does. Distributors also are unlikely to want to rely on the law of large numbers to generate their profits.

Perhaps more to the point, in reality, movies are at least to some degree predictably different from one another. This will make parties want to deviate from any overall mean contracted price M continuously. In other words, the value of the movie to the exhibitor and/or distributor will be such that the transaction will be outside of the self-enforcing range most of the time.

⁸ See Kenney and Klein (1983) and Lafontaine and Masten (2002) for other examples.

Unfortunately, setting the price at the average expected value for a particular movie, i.e. M_i , instead of a generic M will not solve this problem. Instead, it will require all parties to invest in better assessing movie values. The costs of these activities will only serve to reduce the total surplus associated with the transaction. Moreover, in our particular context, setting the price of a movie at M_i would discourage many theaters – all those that expect below average demand in their market – from showing this particular movie. After all, unless distributors can find a mechanism by which they could bundle large numbers of movies together, why should theaters agree to individual transactions that are expected to yield negative profits for them? This, in turn, will lead distributors to try to set different prices for different theaters. Yet unless they can predict box office revenues in each local market, distributors will face exhibitors whose incentives are to represent their particular market as less profitable than others. In addition, if they try to sell copies at very different prices to different exhibitors, exhibitors will have incentives to try to arbitrage away the differences and defeat the distributors’ attempts to price discriminate.^{9 10}

In the end, distributors will be better off if they can rent the copies of movies on a weekly basis rather than sell them, as they indeed do. But setting fixed rental prices every week for each theater ahead of time will require that both distributors and exhibitors expend significant resources again to estimate demand and costs in each market for each week, and then negotiate in advance a weekly price tailored to each theater. Such negotiations will be time consuming and expensive given the fundamental uncertainty about the value of the movie – and all its alternatives - in each market each week. As in Lafontaine and Masten (2002), in order to save on these repeated assessments and negotiation costs, the distributor and exhibitor would like to find some formula to set the weekly rates whereby both parties are likely to find that the transaction remains within the self-enforcing range. This is especially the case here since even with much effort exerted to find the value of the movies in each theater each week, estimates will remain

⁹ Distributors could try to auction off exclusive rights to each movie in each market – theaters would pay up to their expected profits for copies in this case. However, such a process again involves important search and measurement costs, and given much remaining uncertainty, theaters would likely shave their bids in response to winner’s curse issues. Note that bid rigging concerns might arise as well.

¹⁰ Using different specific prices across theaters also might expose distributors to antitrust suits. In the US, for example, the Robinson Patman act forbids price differences not based on costs in manufacturer-reseller contracts.

imprecise, leading to potentially important errors of commission and omission: theaters accepting the movie at a price set by the distributor and failing to cover this cost, and other theaters refusing the movie at the negotiated terms who would have found these terms profitable had they in fact shown the movie on their screen.

The simple solution, we argue, is to base this rental fee on observable results *ex post*. This is exactly what the type of share contract that we see in the industry does.¹¹ More specifically, the share contract allows the distributor to base the rental price each week for each movie in each theater to extract most of the downstream surplus while ensuring that the exhibitor's compensation satisfies his participation constraint most of the time. (See also Kenney and Klein (1983), Klein (1996), Lafontaine and Masten (2002) and Oyer (2004) for similar arguments in very different contexts.)

In the case of movie exhibition, we expect the pricing rule to be based on box office revenues for two reasons. First, revenues are easier for the distributor to observe than profits would be. In particular, the distributor does not know the (opportunity) cost of showing a movie on any given screen at a given point in time – or put differently the exhibitor has every incentive to disguise this cost. But second, and perhaps most importantly, exhibitor costs are mostly fixed, so that a contract based on a share of box office revenue aligns the incentives of the exhibitor quite well with those of the distributor: under such a contract, when costs are fixed, the exhibitor maximizes its profits by maximizing box office revenues as well.¹²

Finally, recall that the exhibitor has the right to end a movie's run at any time. 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

¹¹Another possibility would be for the distributor to rent the theater for a fixed fee each week. But given changing opportunity costs over time, this solution is not as simple as it may seem and would therefore still require much effort in assessing values. Moreover, note the perverse effect this would have on the theater incentives to set prices at low levels to generate higher concession sales.

¹²Of course there is the issue of concession sales and profits, which give the theater incentives to increase patronage (q_{ijt}) at the expense, potentially, of box office receipts. In other words, exhibitors have incentives to reduce the price of movie tickets below the price that maximizes box office revenues if this increases the number of customers at the concession stand. Distributors indeed worry about this effect (see Vogel (2001)). Our point is that as far as the box office is concerned, revenue sharing is equivalent to profit sharing because exhibition costs are basically all fixed.

what he could obtain under available alternatives. In other words, under the revenue sharing contract, the exhibitor retains the movie on the screen if

$$E(r_{ijt} (q_{ijt}(p_j) p_j) + S(q_{ijt})) \geq E(C_{ijt} (\cdot))$$

where r_{ijt} is the share of movie i revenues that exhibitor j retains in week t . Assuming that the $E(C_{ijt} (\cdot))$ remain relatively constant over time (i.e. $E(C_{ijt} (\cdot)) = E(C_{ij}(\cdot)) \forall t$), as the attendance for individual movies decreases with weeks since release, the contracts will have to stipulate a decreasing share of box office revenues for the distributor as the number of weeks since release increases to induce the exhibitor to keep the movie on the screen longer than they would under a contract that stipulated a constant average share over time.¹³ These longer times on the screen of course imply higher movie revenues, which clearly benefit the distributor whose costs are already mostly sunk by the time the movie is released.

Finally, as mentioned earlier, exhibitors can request compensation beyond their agreed upon share when the movie performs below expectations. This implies that the distributor can set terms fairly aggressively if she so wishes, and then revisit the final outcome after the fact. As we show in what follows, below expectations performance indeed regularly prompts request for renegotiation for a given week's outcome, a renegotiation that occurs fairly regularly when the accounts are settled at the end of the run.

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 specify lump-sum payments to go along with the revenue shares. This feature of the contracts is puzzling largely because such fees must be present in share contracts that solve insurance or moral hazard problems, as we discuss further below. However, they would not benefit distributors in our model.

Instead, a lump-sum fee upfront, or a weekly fixed fee for that matter, charged to exhibitors would simply

¹³ In some cases, distributors also pay a proportion of box office revenues to the producer for the right to distribute the movie. In that sense 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.

discourage low demand or high cost theaters from showing the movie, or from showing it as long as they would otherwise.

To see this for the case of a weekly fee, recall that the exhibitor's participation constraint, under a pure revenue-sharing arrangement and risk neutrality, is

$$E[r_{ijt} (q_{ijt}(p_j) p_j) + S(q_{ijt})] \geq E[C_{ijt} (\cdot)].$$

The distributor maximizes its profits subject to this constraint, which we presume is binding. In that context, the addition of weekly fixed fees (W_{ijt}) to the contract, even if tailored to the particular week and/or theater (which would entail some search and measurement costs that would again reduce available surplus but that we ignore here for simplicity), modifies the exhibitor's participation constraint as follows:

$$E[\rho_{ijt} (q_{ijt}(p_j) p_j) + S(q_{ijt}) - W_{ijt}] = E[C_{ijt} (\cdot)].$$

For this condition to hold with positive W 's, the new share parameters, the ρ_{ijt} , will have to be higher than when the W 's are zero. This in turn implies that, for any given distribution of movie revenues each week, the exhibitor revenues will exhibit higher variability, while retaining the same expected value. If we take the exhibition cost, C_{ijt} , to be a positive constant for simplicity, then

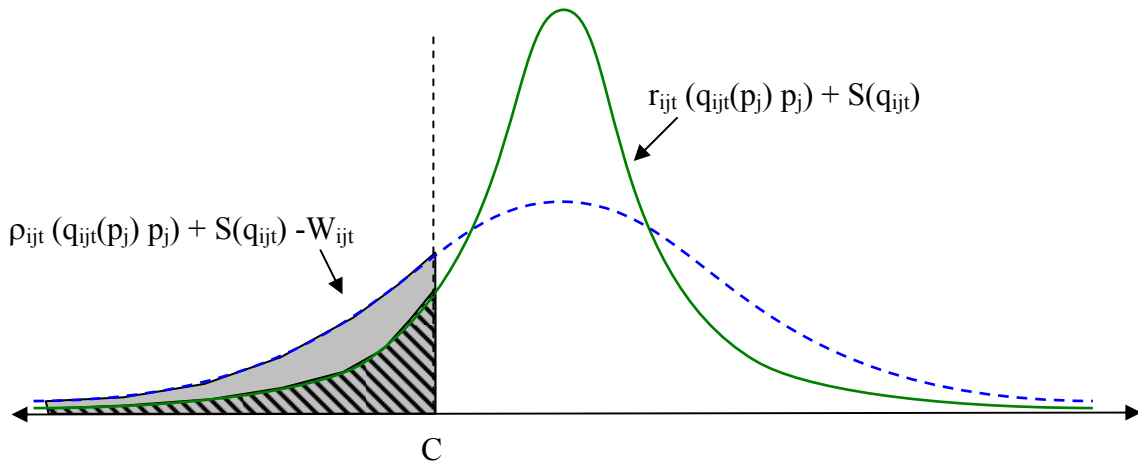
$$\text{Prob} \{[\rho_{ijt} (q_{ijt}(p_j) p_j) + S(q_{ijt}) - W_{ijt}] < C\} > \text{Prob} \{[r_{ijt} (q_{ijt}(p_j) p_j) + S(q_{ijt})] < C\}$$

which implies that the exhibitor revenue will more often be below the cut-off level necessary to satisfy the constraint ex-post.

Assuming a symmetric movie revenue distribution, we show the two weekly net revenue functions for the exhibitor in Figure 1. When the exhibitor net revenues are below C in this figure, there will be a need to renegotiate fees for that week, and an increased probability that the exhibitor will pull the movie the following week. As is clear from the figure and areas underneath the curves, this will occur with greater frequency under the compensation scheme with fixed fees than under the one without such fees. In other words, relying on fixed fees leads to higher renegotiation and earlier movie withdrawal costs, with no attendant benefit. Not surprisingly, then, the contracts do not include such fees.¹⁴

¹⁴ The same 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 altogether is below this fee from taking the

FIGURE 1



Note that a negative fixed fee – an agreed upon payment from distributor to exhibitor - is not desirable either: a distributor that would have to pay a lump-sum fee upfront or every week to exhibitors would minimize its distribution costs by dealing with a smaller number of theaters. Again, total box office revenues for the movie would be adversely affected by the presence of such fees.

Explanations for share contracts that rely on either risk sharing or double-sided moral hazard, by contrast, imply that lump-sum fees normally will be part of the revenue (or profit) sharing scheme. Specifically, 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 lower risk aversion party – must be accompanied by some lump-sum fee paid back to the exhibitor for the exhibitor’s participation constraint to still be satisfied. Similarly, under double-sided moral hazard, the optimal share parameter depends on the desired strength of incentives on both sides, but then given this optimal share parameter, a lump-sum transfer is needed to generate the “right” distribution of profits between the two parties, which in our setting, involves zero profit for the exhibitor.

In addition to providing an explanation for the absence of fixed fees in movie exhibition contracts, our explanation of sharing as an efficient price discrimination device yields a number of other testable implications that we take to data below.

movie. Being excluded from such theaters only reduces total box office for the movie, and hence distributor revenues.

First, when a distributor prices or sets the share parameter for an especially promising movie, namely 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, which means that the exhibitor share, rather than the distributor share, would be higher for blockbusters. In the absence of any fixed fees, of course, such a 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, for movies that are expected to do well, the share to the distributor should begin at a higher level, and go down at a slower pace with weeks since release, 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 higher, over a longer period for such movies.

Third, 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 an exhibitor moral hazard model, lower exhibitor shares would induce lower exhibitor effort, and thus potentially revenues that are low enough that the movie might be pulled earlier than other movies.

Moreover, as discussed earlier, assuming the value of alternative movies remains relatively stable over time, the share to the exhibitor should be such to keep their revenues at a relatively constant level reflecting this opportunity cost. If, on the other hand, the opportunity cost of keeping a movie on the screen varies over time, based largely on seasonal demand and available alternatives, we expect some form of week specific effects to arise in our data quite apart from the effect of time since release.

Finally, there will be circumstances where realization will be below expectations, which will lead exhibitors to request additional amounts of compensation. In other words, in our model, it is when movies do worse than expected that renegotiations will occur, so that we should find that movies whose results

are below expectations have a much higher propensity of ex-post side payments 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.¹⁵

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.¹⁶ We also present here data on the actual run length of the movie per theater, which we

¹⁵ 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.

¹⁶Note 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.

have for a subset of our data.¹⁷ 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.¹⁸ 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 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

¹⁷ 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.

¹⁸ 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.

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.¹⁹

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 stipulate this division directly, here it is obtained by having the distributor receive more than 57% of box office revenues for the first week or two, and then a lower share of box office revenues in the following weeks.

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

¹⁹ Unfortunately, we could only ascertain the construction year for 70 of the 91 theaters in our data.

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. Finally, the data on realized movie run lengths shows 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.²⁰ Moreover the actual run lengths are, on average, shorter than the period contracted on. This confirms 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 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.²¹

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 previous 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

²⁰ 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.

²¹ We learned about this and other industry practice from several interviews with industry insiders.

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 for movies they expect will generate high box office revenues. We test this prediction in two steps – first, we show that distributors and exhibitors can rely on information about a movie’s release or success in the US to predict how well it will do in Spain. In other words, they 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 as well. Finally, we briefly discuss how these results and others are inconsistent with standard risk-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 (see 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.²²

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%.

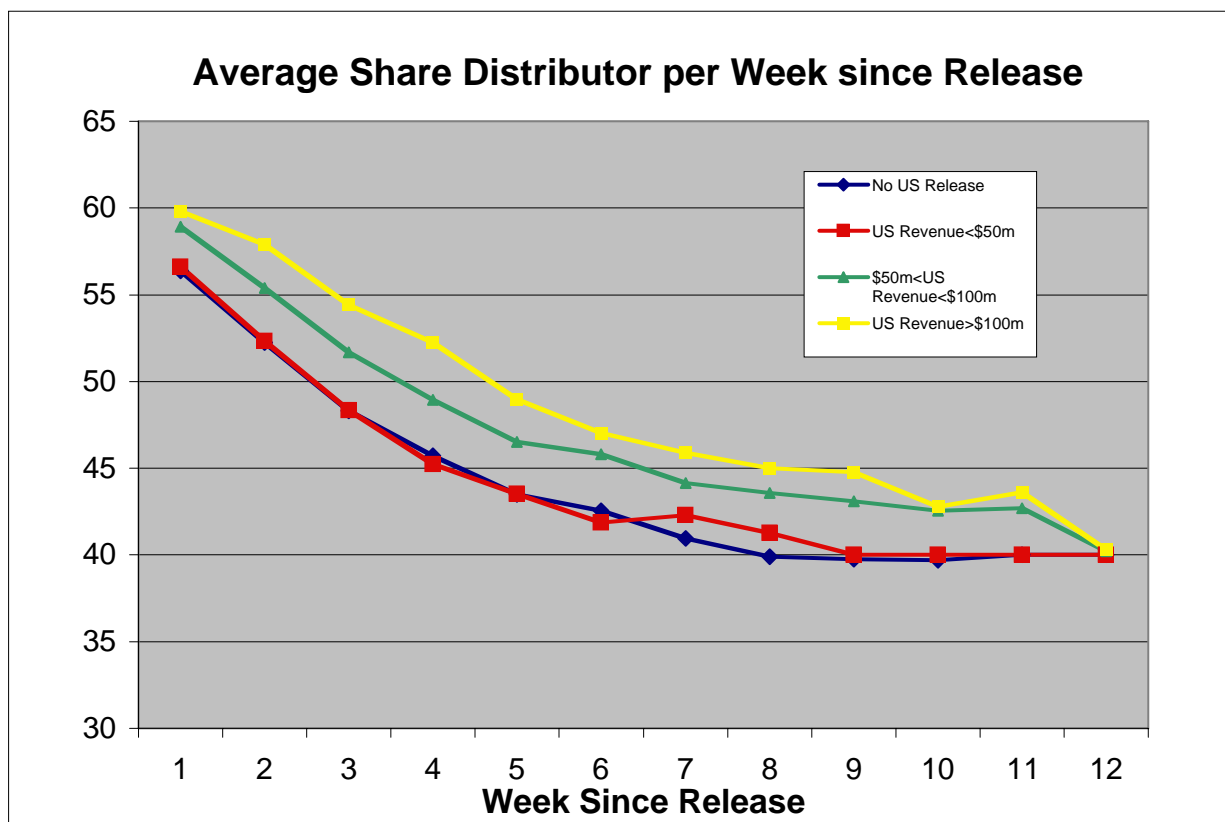
Since US release or box office information allows distributors to predict how well movies will do in Spain, our model implies that stipulated distributor shares should be higher for movies that do better in the US.

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 \$50 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.

²² Spanish movies are always released first in Spain. 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.

FIGURE 2



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 evolve 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 effect, 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.

TABLE 3: DISTRIBUTOR SHARES PER MOVIE/THEATER/WEEK

Independent Variable:	(1)	(2)	(3)	(4)
US Release	-3.14*** (0.10)	-3.16*** (0.10)	-2.73*** (0.19)	-2.68*** (0.19)
Ln[1+US Box Office]	1.13*** (0.03)	1.11*** (0.03)	0.95*** (0.03)	0.94*** (0.06)
Week Since Release	-2.16*** (0.02)	-2.18*** (0.02)	-2.13*** (0.02)	
Week Since Release*US Box Office	0.003***	0.003***	0.003***	0.005***

	(0.000)	(0.000)	(0.000)	(0.000)
Christmas Week	0.69***	0.72***		
	(0.12)	(0.12)		
Other Holiday Week	-0.06	-0.05		
	(0.06)	(0.06)		
Ln[1+U.S. Box Office of Concurrent Releases]	-0.21***	-0.21***	-1.03***	0.22***
	(0.02)	(0.02)	(0.03)	(0.08)
Movie Duration (in minutes)	0.01***	0.01***	0.01***	0.02***
	(0.001)	(0.001)	(0.001)	(0.002)
Constant	56.15***	56.31***	59.94***	43.86***
	(0.16)	(0.16)	(0.20)	(0.48)
Theater FE	No	Yes	No	No
Week-Theater FE	No	No	Yes	No
Week-Theater-Week since Release-FE	No	No	No	Yes
Observations	52321	52321	52321	52321
R-squared	0.56	0.56	0.61	0.86

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

The results in Table 3 are very consistent across our different specifications, that is regardless of whether we control for theater, time or week since release fixed effects. In other words, 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, that is \$16M to \$18M in box office revenues in the US, 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.²³ 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 our second prediction: that distributor shares decline less rapidly over time since release for more popular movies. While the distributor share declines by more than two percentage point 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

²³ For example, in column 1, $\exp(3.14/1.13) = 16.1$.

office reduces the weekly decline in distributor share by 0.03 percentage points, or 1.39% ($100 \times 0.03/2.16$) 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 that distributor shares are higher for movies released during Christmas week, but lower for movies released simultaneously with many other US box office hits. The former result suggests that high-demand periods are associated with high revenues for movies such that the shares left to exhibitors need not be as large as at other times.²⁴ The latter result implies, on the other hand, that the opportunity cost of showing a particular movie is higher when many other important movies are available at the same time, leading to higher shares being offered to exhibitors in weeks with many valuable releases. Finally, our results imply that distributor shares are higher for longer movies. 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 that our results on movie length in fact confirm our prediction that high quality movies yield higher distributor shares. In any case, our results above remain the same when we exclude movie duration from our regressions.²⁵

In Table 4 we shun the use of theater fixed effects in order to explore in more detail how theater characteristics affect distributor and exhibitor shares. Recall that our model is based on the idea that the share to the exhibitor must satisfy his participation constraint. This has two main implications when it comes to theater characteristics: first, it implies that higher cost theaters will require higher shares. Since we expect that older theaters are more costly to run, we expect them to obtain relatively high shares. Second, the participation constraint relates what the exhibitor earns on this movie to what he could earn if

²⁴ We verified that in our data, box office revenues are higher during the weeks we identify as major holiday weeks.

²⁵ We have also considered how movie genre might affect observed shares. 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.

he negotiated with an alternative distributor for a different movie. We expect the exhibitor will have more outside opportunities the larger the theater is – as captured by the number of screens – and the larger the exhibitor’s share of the local exhibition market – measured by the number of seats in all the theaters owned by the exhibitor in the city divided by the total available seats in the city.

TABLE 4: DISTRIBUTOR SHARES PER MOVIE/THEATER/WEEK

Independent Variables:	(1)	(2)	(3)
US Release	-3.13*** (0.11)	-4.19*** (0.10)	-4.06*** (0.10)
Ln[1+US Box Office]	1.10*** (0.03)	1.56*** (0.02)	1.55*** (0.02)
Week Since Release	-2.14*** (0.02)		
Week Since Release*US Box Office	0.002*** (0.0001)	0.0005*** (0.0001)	0.0003*** (0.0001)
Theater Age	-0.03*** (0.01)	-0.08*** (0.01)	-0.08*** (0.01)
Screens	-0.02** (0.01)	-0.05*** (0.01)	-0.04*** (0.01)
Exhibitor Market Share	-0.21*** (0.07)	-0.15** (0.06)	-0.15** (0.06)
Christmas Week	0.75*** (0.12)	1.15*** (0.11)	
Other Holiday Week	-0.07 (0.06)	-0.02 (0.05)	
Ln[1+U.S. Box Office of Concurrent Releases]	-0.23*** (0.02)	-0.07*** (0.02)	-0.29*** (0.03)
Movie Duration (minutes)	0.01*** (0.001)	0.02*** (0.001)	0.02*** (0.001)
Constant	56.64 (0.20)	46.89 (0.17)	53.70 (0.20)
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 in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Results in Table 4 support the predictions above. First, a theater’s age indeed has a 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, we note that the results in Table 4 further confirm the effects we found above for US box office and distributor shares. That is, 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.

Finally, Table 5 shows 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 more successful US-released movies have higher maximum distributor shares (the contract starts at a higher distributor share) but also specify lower minima, and they involve sharing terms for a higher 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 attendance, it is profitable for exhibitors to do so regardless of the more adverse contract terms.

TABLE 5: MOVIE/THEATER CONTRACT TERMS

	Max Share		Min Share		Weeks Contracted		Actual Run Length	
US Release	-2.60*** (0.17)	-2.18*** (0.19)	0.66** (0.27)	1.65*** (0.25)	-2.48*** (0.11)	-1.94*** (0.10)	-2.95*** (0.19)	-2.53*** (0.19)
Ln[1+US Box Office]	1.09*** (0.03)	1.06*** (0.06)	-0.32*** (0.06)	-0.73*** (0.07)	0.96*** (0.03)	0.79*** (0.03)	1.11*** (0.05)	1.02*** (0.06)
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** (0.12)	0.21 (0.64)	1.19*** (0.19)	-0.35 (1.05)	-0.65*** (0.09)	0.05 (0.56)	-0.58*** (0.14)	-0.32 (0.63)
Christmas Week	0.45** (0.19)		0.18 (0.33)		1.29*** (0.22)		1.17*** (0.41)	
Other Holiday Week	0.81*** (0.10)		-0.85*** (0.17)		0.45*** (0.08)		0.59*** (0.19)	
Ln[1+U.S. Box Office of Concurrent Releases]	-0.02 (0.02)	0.07 (0.07)	-0.12*** (0.04)	-0.76*** (0.09)	-0.04** (0.02)	-0.22*** (0.05)	-0.14*** (0.04)	-0.34*** (0.09)
Constant	57.49** (0.27)	56.53*** (0.63)	44.63*** (0.36)	41.89*** (0.97)	4.45*** (0.15)	5.10*** (0.32)	2.37*** (0.29)	0.63 (0.49)
Week Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Theater Fixed Effects	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 in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Results from Table 5 also show that distributor shares again are higher when movies are released during Christmas or other holiday weeks and when the movie is shown in newer smaller theaters that are run by exhibitors with lower market shares of seats. We find similar effects in our weeks contracted upon and actual run length regressions, except that the number of screens leads to longer contract duration. The latter is probably best explained by the larger theater's capacity to move the movie to smaller screens over time. Also theater age has a positive rather than negative effect on actual run length, an effect that probably reflects the location of older theaters near city centers. Overall, 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 so far that movie revenues in a given week at a given theater are always uncertain, for both 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. 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. As mentioned previously, it is standard practice in the industry for distributors to pay further amounts to exhibitors when movie revenues are unexpectedly low for a given week.²⁶ 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.

²⁶ 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 20,000 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, as noted above, 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 monetary 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. This of course keeps the cost of settling the accounts lower than it would be if renegotiations occurred weekly. Also, both parties recognize the value of their future relationship. Consequently, the firms agree to new terms fairly quickly. Industry participants noted that firms sometimes disagree and retaliation can occur, but this remains quite rare.

Our model, however, specifically predicts that these renegotiations will occur more often for movies that are not as successful as the parties expect them to be at the time of contracting. As contracting occurs weeks prior to the movie's release in Spain, the parties have limited information to go on. As mentioned earlier, according to company representatives, US box office is a good predictor of a movie's likely performance in Spain. 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. More importantly, we also rely on "deviation from expected outcome," measured by the error terms from our earlier regression, in Table 2, of Spanish on US box office, to capture the effect of a movie meeting or not its expectations. 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 of similar movies in Spain.

Results from our analyses on renegotiation are shown in Table 6. Consistent with our model, 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. In addition, as predicted, we 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.²⁷ 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*** (0.02)	-0.14*** (0.02)	-0.16*** (0.02)	-0.16*** (0.02)	-0.12*** (0.02)
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*** (0.002)	-0.03*** (0.002)	-0.03*** (0.003)
Constant	0.73*** (0.02)	0.73*** (0.02)	0.76*** (0.02)	0.76*** (0.05)	0.80*** (0.13)
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

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

²⁷ Note that the intercept for the regression results in Table 6 is high, at .73 in column 1, 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 successful movies, which are shown in less theaters and for fewer weeks, and are much more likely to require renegotiation, as much as we do more popular movies, shown longer periods and on more screens, and that are much less likely to require further transfers.

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 pretty flexible in the sense that all understand that further lump-sum payments by distributors to exhibitors will be forthcoming if the terms agreed upon do not provide exhibitors with sufficient returns. Still, box office revenue sharing allows the parties to 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 easily could be interpreted as 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 and with higher market shares in their markets 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.

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. As described above, 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. Based on this evidence, and the absence of fixed fees, which would be required to redistribute earnings, we conclude that risk-sharing is not the right explanation for the form of these contracts.

Another explanation for revenue sharing that is found in the literature is that this type of compensation scheme addresses moral hazard issues, either trading off insurance and incentives if the

agent is risk averse and is the only party putting forth effort, as in the traditional agency model, or trading off the incentives of both parties in a context where both need to put forth effort, as per double-sided moral hazard model.²⁸ There are several problems with these explanations in the current context. For one thing, as argued above, this explanation would also normally imply that the parties would rely on fixed fees to redistribute income between them given that the share parameter is fixed by incentive and value of effort (and, in the traditional model, risk and exhibitor risk aversion) considerations. Thus the systematic absence of fixed fees challenges the validity of these incentive arguments. Second, and probably most important in the current context, 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.²⁹ Related to this latter argument also is the fact that there is not a 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 and more, as well as the absence of fixed fees in these contracts, and finally the one-sidedness of contract renegotiation – or side-payments – in the industry.

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. We also have shown that this price discrimination argument captures several important features of these contracts. In particular, we find that distributors

²⁸ 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.

²⁹ 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.

retain higher shares for themselves, and that this 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 because the number of movie goers remains sufficient to satisfy the exhibitor's participation constraint despite their lower share of revenues. We also found that exhibitors with higher market share of seats obtain higher shares of revenue holding everything else constant. 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 here are simply a formula for setting flexible rental prices for the movies.

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 side payments we observe in this industry.

We believe that it is the extent to which costs are sunk in the movie industry in general that makes it a perfect 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 potential negative incentive effects that revenue sharing could have in other contexts. In other words, when costs are sunk, the goals of contracting parties are more or less the same whether they maximize their share or total revenues.

Without denying the importance of incentives in other settings, we believe this argument for sharing as a way to achieve flexible pricing applies also in other contexts, including other parts of movie production and distribution, but also in settings such as publisher/author relations, mall leases, franchising and licensing. In fact, as mentioned earlier, Lafontaine and Masten (2002) use a related approach 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 store, distributors and consumers do better under revenue sharing, also fundamentally amount to the idea

that these contracts lead to “better” prices between channel members, that is prices that lead to the right choice of quantity.

Our hope is that our argument, and the supporting evidence we provide, will help advance not only our understanding of the movie distribution industry, but also our understanding of sharing in the economy beyond the standard risk-sharing and incentive arguments that are now common in the literature, and that themselves replaced the initial perception still found among some groups of economists that share contracts are by definition wasteful and a reflection of poorly functioning institutions.

References

- Allen, Douglas W., (1991) "What Does She See In Him? The Effect of Sharing on the Choice of Spouse," *Economic Inquiry*, 30(1): 57-67.
- Allen, Douglas W. and Dean Lueck (1992) "Contract Choice in Modern Agriculture: Cash Rent vs. Cropshare," *J. of Law and Economics*, 35(2): 397-426.
- Allen, Douglas W. and Dean Lueck (1993) "Transaction Cost and the Design of Cropshare Contract," *Rand Journal of Economics*, 24(1): 78-100.
- Bajari, Patrick and Steven Tadelis (2001) "Incentives Versus Transaction Costs: A Theory of Procurement Contracts," *Rand Journal of Economics*, 32(3): 287-307.
- Barzel, Yoram (1982) "Measurement Cost and the Organization of Markets," *Journal of Law and Economics*, 25(1): 27-48.
- Cachon, G. P. and Lariviere, M. A. (2005) "Supply Chain Coordination with Revenue-Sharing Contracts: Strengths and Limitations," *Management Science*, 51: 30 - 44.
- Chisholm, D. (1993) "Asset Specificity and Long-Term Contracts: The Case of the Motion-Pictures Industry," *Eastern Economic Journal*, 19(2): 143-155.
- _____ (1997), "Profit-Sharing Versus Fixed-Payment Contracts: Evidence from the Motion Pictures Industry," *The Journal of Law, Economics, & Organization*, 13(1): 169-201.
- De Vany, A. and Lee, C. (2001), "Quality Signals in Information Cascades and the Dynamics of the Distribution of Motion Picture Box Office Revenues," *Journal of Economic Dynamics and Control*, 25: 593-614.
- De Vany, A. and Walls, D. (1996), "Bose-Einstein Dynamics and Adaptive Contracting in the Motion Picture Industry," *Economic Journal*, 106: 1493-1514.
- _____ (1997), "The Market for Motion Pictures: Rank, Revenue and Survival", *Economic Journal*, 35: 783-797.
- _____ (1999), "Uncertainty in the Movies: Can Star Power Reduce the Terror of the Box Office?", *Journal of Cultural Economics*, 23: 285-318.
- Einav, L. and Orbach, B. (2006), "Uniform Prices for Differentiated Goods: The Case of the Movie-Theater Industry," manuscript, 2006.
- Filson, D., Switzer, D. and Besocke, P. (2004), "At the Movies: The Economics of Exhibition Contracts", forthcoming in *Economic Inquiry*, 43(2): 354-369.
- Gil, R. (2004), "Contracting in the Spanish Movie Industry", Ph.D. Dissertation, University of Chicago.
- Goettler, R. and Leslie, P. (2005), "Cofinancing to Manage Risk in the Motion Picture Industry," *Journal of Economics & Management Strategy*, 14: 231-61.

- Hanssen, A. F. (2002), "Revenue Sharing in Movie Exhibition and the Arrival of Sound", *Economic Inquiry*, 40: 380-402.
- Kenney, Roy and Klein, Benjamin (1983), "The Economics of Block Booking", *Journal of Law and Economics*, 26: 497-540
- Kenney, Roy and Klein, Benjamin (2000), "How Block Booking Facilitated Self-Enforcing Film Contracts," *Journal of Law and Economics*, 43: 427-436.
- Klein, Benjamin (1996), "Why Hold-ups Occur: The Self-Enforcing Range of Contractual Relationships," *Economic Inquiry*, 34: 444-463.
- Lafontaine, Francine (1992), "Agency Theory and Franchising: Some Empirical Results," *Rand Journal of Economics*, 23(2): 263-283.
- Lafontaine, F. and Masten, S. E. (2002), "Contracting in the Absence of Specific Investments and Moral Hazard: Understanding Carrier-Driver Relations in the US Trucking", NBER Working Paper # 8859.
- Lerner, J. and Schoar, A. (2004), "Transaction Structures in the Developing World", NBER Working Paper # 10348.
- Oyer, P. (2004), "Why Do Firms Use Incentives That Have No Incentive Effects?", *The Journal of Finance*, 59: 1619-1649.
- Slade, Margaret E. (1996) "Multitask Agency and Organizational Form: An Empirical Exploration," *International Economic Review*, 37: 465-486.
- Squire, J. E. (1992), *The Movie Business Book*, Published by Simon & Schuster, 2nd Edition.
- Vogel, H. (2001), *Entertainment Industry Economics*, Cambridge University Press, 5th Edition.
- United States v. Paramount Pictures, Inc.*, 334 U.S. 131 (1948).