Recent Research on the Motion Picture Industry

By

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The Motion Picture Industry

1. Introduction

The motion picture or film industry is a 14 billion-dollar business. American studios alone produce over 450 feature films exhibited at 25,000 theater screens (including multi-screen or multiplex theaters) in the U.S. and Canada. Revenues, however, no longer come primarily from traditional local theaters, known as theatrical releases. "Sell-through" home videos sold to the mass market, rental videos sold to video stores, broadcast television, cable television, merchandising rights, publication rights and, primarily, international receipts, now usually provide more revenue. The feature film Basic Instincts, for example, generated twice as many international box office receipts ($235 million) as domestic receipts ($117 million).¹

New films continue to break the record for top box office gross. In 1982, the motion picture E.T.-The Extra-Terrestrial held the record with $228 million in domestic sales. In 1993, the motion picture Jurassic Park broke that record. In only 23 weeks, Jurassic Park box office gross was $330 million, domestically, and $525 million, internationally. For both feature films, box office receipts were only a small part of the generated revenue. Both films also provided substantial revenues from licensing ancillary products including toys, video games, clothing and other merchandise including subsequent films on how the original film was made. Figure 2, for example, illustrates some of the wide-variety of merchandise generated by the film Teenage Mutant Ninja Turtles.

Similar to other services, the largest expenses come from distribution rather than production expenses or raw materials. The selling of motion pictures is as large a business as the production. The cost of promoting a feature film is often of the same magnitude as the production of the film itself. The film, *Jurassic Park*, for example, cost $60 million to produce. Universal Studios and licensed merchandisers, in contrast, spent $68 million in promotional expenses.

1. **Motion Pictures as a Risky Business**

In nearly every industry, the introduction of new products and services is replete with dangers. Many industries are very innovative and offer many new services each year. Many hospitals, for example, are not only seeking new medical devices incorporating the latest technology; they are also developing new outpatient services such as mobile mammography.

The motion picture industry, however, may represent the ultimate in risky businesses. For the motion picture industry, every motion picture is new. Unlike other services whose revenue comes primarily from repeat sales of existing services, studios get nearly all their revenue from new films. For many motion picture studios, return from large investments often depends on one weekend of sales at the box office.
Studios must frequently endure a series of serious losses before recovering their efforts with an enormous success. Given this environment, studios face enormous risks. These risks create a need for diversification. Without diversification, a studio may not last to the next hit film. Consequently, most major studios have become part of large conglomerates with very deep pockets.

We must remember that the entire process of film development must be profitable. Development of successful or very successful films may be insufficient. For the film development process to be profitable, the profits from each success film must also often cover the costs of development. Hence, the profits of a successful film might need to cover the production of four or five unsuccessful films.

2. Motion Pictures as Art

Individual investors, pension funds and mutual funds buy stocks in corporations in order to secure a return on their investments. Corporations, in turn, have the fiduciary duty to provide the best possible return to their owners, the stockholders. This is true regardless of whether the corporation makes television sets or motion pictures. Individual investors can always, if they choose, support philanthropic or artistic organizations. When they invest in a public corporation, the corporation has the duty to exercise the best possible management of their investment.

Despite the considerable investment in filmmaking, many filmmakers considered and still consider motion pictures to be an art. The filmmakers considered wardrobe selection, scripting, casting (i.e., choosing stars, supporting players, extras), shooting, editing and other activities to be unique to their craft. The filmmaker who, like a skilled artist, expresses inspiring, thrilling or disturbing messages that may only be fully appreciated by the true connoisseur. The motto of the traditional Metro-Goldwyn-Mayer (MGM) studio was Ars Gratia Artis (Art-for-Art's Sake).

Screenwriters (who write the film's script), directors (who supervise the creative part of the film's production), actors (who become the film's characters), producers (who control the actual film production), critics (who evaluate the film) and others involved in moviemaking often distinguished between the excellence of the film and box office success. Some moviemakers filmed or shot motion pictures primarily to impress other moviemakers.

The idea of developing products to impress peers is not unique to filmmaking. Many engineers seek magnificent designs that use state of the art components, the most advanced
integration and the best materials. These designs, nevertheless, often fail to deliver a customer benefit because they ignore the marketing concept. Without the customer benefit, technical excellence is irrelevant. The entertainment industry must provide profitable entertainment.

Few directors or actors have a formal background in business, let alone marketing. Moviemakers often have backgrounds in acting, cinema, theater or film distribution. Those who proclaim to evaluate feature films often have experience in journalism, literature or language. Historically, marketing had little involvement except in the selling function. Marketing was responsible for the selling, advertising and distribution, of a finished motion picture.

As in most industries, selling without marketing is a difficult or impossible task. Without a marketable product, improving communication usually provides little reward. The problem is exacerbated in the film industry where actors and directors often accept acclaim for successful motion pictures while studio-marketing executives receive the blame for failures. Often, filmmakers attribute failures to improper timing of the release, insufficient advertising support, booking the wrong theaters and so on.

Despite the past, the status of marketing is changing and marketing is becoming more influential. There are several reasons for this change. Faced with new competition and technological advances, the closed circles in Hollywood have increasingly hired executives from outside the industry. Many studio executives are coming from packaged-goods industries. Many producers and directors are coming from television. These later industries employ sophisticated marketing techniques that encompass more than selling.

Another factor increasing the importance of marketing is the swelling cost of producing motion pictures. Budgets for films continue to grow. The largest budget to 1991 was $95 million for the production of Terminator 2: Judgment Day. Arnold Schwarzenegger, the film's star, earned $15 million. Beyond the nearly one hundred million dollar budget, prints and publicity cost an additional $20 million. Today, the cost of producing the most expensive films has doubled.

Still another factor is the purchase of most major studios by large sophisticated conglomerates. The Warner Brothers Studio is owned by the huge Time-Warner Conglomerate who also owns many cable TV channels, newspapers, magazines and other companies in communications. Touchstone Pictures is owned by Walt Disney Company. In 1989, Coca-Cola Company sold Columbia Pictures Entertainment, consisting of the original Columbia Studio and Tri-Star Pictures, to Sony of Japan for $3.4 billion. The Seagram
Company owns MCA and its Universal Studios. Italian financier Billionaire Kirk Kerkorian purchased the combined studios of Metro-Goldwyn-Mayer for 1.4 billion in 1996, a studio that he purchased twice before. Merrill Lynch Capital Partners Inc. owns United Artists, which is currently in Chapter 11 bankruptcy proceedings\(^2\). Clearly, studios will be under great pressures to begin generating profits.

### 3. This Paper

This paper summarizes three recent projects that I have completed on the motion picture industry. For each project, this paper summarizes the research problem, the type of analysis completed and the results of the project.

The first project looked at the ability to use intent measures taken prior to the release of a film to forecast motion picture box office after release. Intent measures are common measures to predict new product sales in frequently purchased packaged goods.

The second project constructed a model for forecasting the box office of a film before the film was made. Although the model is not as accurate as the one found in the first project, it does provide guidance to filmmakers in the initial planning phase.

The third project attacks the problem of when to release a film when strong seasonal patterns are present. Specifically, the paper asks the question about when to launch when the film is completed during the low season and the high season is still several months away.

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1. The Basic Approach

A recent paper completed by Joffre Swait and myself investigates whether it is possible to use intent-to-view measures as a basis for making box office forecasts. Although useful mathematical models have been developed to forecast the box office of films shortly after release, these models depend on box office data that would not be available pre-release. Hence, pre-release forecasting has remained an important problem.

To forecast the box office of a motion picture before its release, we used two sources of information about the film. The first source was a forecast based on the prior history of other films that involved some or all of the same cast members, directors, producers and screenwriters. The second source of information was the stated-intent-to-view the film provided by a sample of people (i.e., respondents) who were given information about the film. The stated-intent was provided on a 9-point scale varying from definitely will not see the film (a one out of nine) to definitely will see film (a nine out of nine).

Before describing the actual procedure used, it will be useful to first discuss the conceptual foundation for the forecasting model. Figure 2 provides a brief overview.

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The box office for a film primarily depends on three factors. The first factor is the marketing effort behind the film. The marketing effort determines whether movie-goers can see the film because without sufficient distribution it may not be shown in their area. The marketing effort also determines whether movie-goers have heard of the motion picture.

We can estimate the first factor by considering variables such as the advertising budget for the film and the number of opening screens. This information would be known by a distributor before the launch of a film and could be used for forecasting purposes. In our mathematical model, we only use the number of opening screens because the number of opening screens is highly correlated with the total market effort on the film.

The second factor is the film appeal. To determine film appeal, we use another model that forecasts box office success from the people who made the film. The data includes the past histories of the cast members, the directors, the producers and the screen writers. Given the known performance of their past films, it is possible to predict the appeal of the current film. Although we expect some error in this forecast because of implementation problems in making the film, it is possible to provide a good ball-park estimate of how well the film will be liked. The performance of past films made by the people provides substantail information not contained in the other factors. It is important to note that there is no assumption here that moviegoers are aware of any of these people (e.g., screenwriters) or the player’s past
histories. For this factor, we are only using past histories to predict the appeal of the actual film and not the ability of the people’s names (e.g., the director’s name) to draw moviegoers. We capture that later effect with the third factor.

The third and final factor is the information available to moviegoers about the film. This factor very complex. Movie-goers get information about the film from a variety of sources including film reviews, trailers, entertainment programs and word-of-mouth. These sources of information may be conflicting and contain errors. It is very possible that a moviegoer sees a film that disappoints because the information was bad. It is also very possible that a moviegoer misses a film that would be enjoyed, again because information was bad. This fact makes it difficult, if not impossible, to predict the quality of information that each movie-goer acts upon.

Fortunately, our task is only to forecast box office and box office only reflects the average behavior of moviegoers. That behavior should be highly related to whether the film is a match with the movie-goers preferences. Remember that we are already controlling for the first factor, which considers whether the moviegoer is aware of the film and whether the film has sufficient distribution.

After providing respondents with information about the film, including a script synopsis, the trailer and the people involved in making the film, we ask the respondents their likelihood to view the motion picture. They are asked using a standard nine-point scale. This likelihood measurement captures whether information about the film will be viewed positively or negatively. It also indirectly measures whether word-of-mouth information about the film will be positive or negative. However, we expect the film appeal attribute to also capture this effect.

We can now develop a model that accurately links stated intent-to-view with ultimate box office performance. However, we must be aware of past research regarding stated intent-to-purchase for both durable and non-durable goods. That past research has generally found a very weak correlation between stated intent to purchase and actual subsequent purchase. To obtain the necessary accuracy, we need to overcome this inherent weakness in intent measurement. Once that is done, we can combine the third factor with the other two factors and we are able to make accurate box office forecasts. Moreover, given that the other two factors (i.e., marketing expenditures and the design attributes of motion pictures) are under the control of studio management, our model also allows studios to make better decisions regarding choice of directors, producers, principal cast members and screenwriters.
2. Past Research Using Stated Intent Measures

Our model can more accurately forecast motion picture box office compared to other existing published methods. Part of our forecasting ability comes from the superior way that we exploit the intent-to-view data.

To understand how we exploit the intent-to-view data, consider a recent application of the model. In this application, we measured intent-to-view using 51 trailers shown to undergraduate students before the films were released. We considered the impact of other design attributes by using a forecast generated by another model. The later model was estimated on data from 2,770 theatrical releases of feature films appearing from 1980 to 1996.

Although the intent-to-view measurement task was similar to past research where weak correlations with actual behavior were found, our use of the data differed from that past research. We were able to customize our model to the unique aspects of the new motion picture forecasting problem. By customizing our model to the specifics of the problem, we were able to develop a better forecasting tool.

For example, there are at least two major differences with past research when using intent measures based on movie trailers. First, in prior research, the measure of intent is often done in an objective context. When asking whether a respondent expects to buy a refrigerator in the next six months, the researcher only asks the likelihood of purchase. The researcher provides no persuasive information regarding whether the purchase should occur. The respondent, therefore, might only consider the age and condition of their current refrigerator in formulating her answer. The “true” answer depends on events unknown to the respondent, such as whether their current refrigerator will last another six months or whether the local appliance store will have a massive sales event. As the respondent gets new information, she may revise expectations upward or downward depending, for example, on whether the existing refrigerator continues to function well.

The situation is much different for a motion picture: when we measure intent-to-view for the movie, the measurement is not done in a neutral setting. Instead, the intent measure is taken directly after the respondent sees a trailer. That represents, hopefully, the best possible advertisement for the movie. Thus, we would expect that intent measures should overstate actual purchase probabilities for the following reason: as the impact of the advertisement diminishes over time, the respondent will return to a more neutral state, negating somewhat the earlier effectiveness of the advertising exposure. Although this problem is well known in
the advertising literature, it has not been applied in the area of forecasting from intent measures. It will be necessary, therefore, to consider the decay from the time when trailers occur and the time when the movie is available to exhibitors.

A second major issue, when using trailers, is that when considering movies is that most motion pictures must be seen within a relatively short time after exposure to the advertising message. It is possible to purchase a new refrigerator any time an old refrigerator begins to deteriorate. The same is true for many other durable goods for which intent-to-purchase measurements are made. The situation is very different for motion pictures. Movies are released on a specific date and must then be seen during specific scheduled times which may conflict with other activities of moviegoers. Exhibitors respond to these facts by extending the life of popular movies through lengthening the run of the movie and increasing the number of screens showing the movie. This creates an extreme non-linearity, such that less popular films become less available, further decreasing their box office and causing otherwise accurate forecasts to overstate box office. Therefore, when we forecast that only 1% of moviegoers will see a film, holding availability constant, we actually expect that less than 1% will be able to find an exhibitor showing the film when they decide to see it. Clearly, this factor also requires adjustments.

It is also useful to contrast motion picture choice to the brand-choice situation. When intent measures are taken for packaged goods, respondents are usually sampled from the category-user population. Here the user is likely to purchase in the product category at regular intervals, so the primary uncertainty concerns, which brand is chosen. The intent-to-purchase a new brand is only a choice of the brand within the category and not of the category itself. With new durables, such as movies or electronic items, the choice is often whether to purchase in the category itself. A moviegoer must decide to see a movie as well as which movie to see.

Also, most moviegoers usually see a motion picture only once or not at all. This situation differs from the purchase of packaged goods. In the latter case, purchases often occur at regular intervals. It is easier to persuade a buyer to make a one-time trial purchase of a new packaged good than to commit an evening to a movie. Hence, the relationship between intent-to-view and actual behavior involves different factors, a fact well known within the intent literature.

Finally, we are interested in aggregate predictions and not whether a particular individual sees a motion picture. The problem of matching what an individual says and what that same individual subsequently does is a different problem than the problem of predicting
aggregate sales based on a sample of stated intent-to-view measures. The former problem involves numerous psychological problems to understand the underlying consumer psychology and, ultimately, consumer behavior.

3. **A New Way to Model Intent-to-View**

Our analysis of the preceding factors suggested that the intent-to-view measurement should show a strong non-linear relationship with actual behavior. Part of the reason is that the effect of any persuasive advertising, including persuasive trailers, should rapidly diminish. That rate, however, is less prevalent on the informational content of the advertisement. Hence, an advertisement that informs the viewer of specific product attributes has a lasting effect while an advertisement that merely gets the viewer excited quickly diminishes over time.

A second reason for the non-linear relationship is that, unlike a refrigerator or automobile purchase, most motion pictures are seen by a very small percentage of the population at the theater.

A third reason for the non-linear relationships is what we call the feedback effect. As noted earlier, when a film is not doing well, exhibitors try to decrease the number of screens. When a film is doing very well, exhibitors increase the number of screens. The impact is either a dramatic amplification or contraction in both the life of the film and the number of occasions during a day when the film can be seen. Consequently, without a sufficient number of 9-responses, the film dies and that leaves no opportunity for less enthusiastic respondents to see the motion picture.

Therefore, on a 9-point scale, those entering less than 7 have a very small chance of seeing the film at the theater. Hence, the probability of seeing a film decreases dramatically from 9 to 8 to 7. For example, suppose we have a film with an average intent of 3.9, but 5% of the respondents indicate a very high likelihood of viewing the film, i.e., a rating of nine. Now suppose we have a second film with an average intent of 5.1, but only 2% of the respondents indicate a very high likelihood of viewing the film. Although most people like the second film better, that fact is unimportant because most people will not see the film. We predict that the first film will do better because it has 5% of the population very likely to see it while the other film only has 2% who are enthusiastic about the film. The rating by the average potential moviegoer is irrelevant. All that matters is the number of people who are very enthusiastic about the movie. In other words, a movie needs a high percentage of 9-
responses (on a scale from 1 to 9).

We do find this result in our data. For example, figure 3 shows the distribution of intent measures for the motion picture Beavis and Butthead Do America.

Figure 3: Distribution of Intent-to-View: Beavis and Butthead Do America

Figure 3 shows the percentage of respondents who responded with a 1, 2, 3, ..., 9 indicating (1=definitely will not see the film to 9=definitely will see the film). There are many more people who would never see the film than people who would definitely see it. The mean intent-to-view for the motion picture Beavis and Butthead Do America was about 5.06.

However, the film had a very impressive box office of $63.118 million. The reason for the impressive box office was the number of very high intent scores. Over 20% of the respondents indicated that their intent-to-view the movie as an 8 or 9 on a nine-point scale.

Now consider figure 4.

Figure 4: Distribution of Intent-to-View: McHale’s Navy
Figure 4 shows the distribution of intent-to-view the motion picture “McHale’s Navy”. This motion picture had about the same average intent-to-view as the motion picture Beavis and Butthead Do America. However, the percentage of enthusiastic 8 and 9’s are missing. We observed that McHale’s Navy had a dismal box office of $4.368 million compared with the $63.118 million for Beavis and Butthead Do America.

Hence, it is important to correctly weight the distribution when making forecasts. We have found, for example, that although the correlation of the average intent-to-view is only weakly correlated with box office, the average of the squared intent-to-view is highly correlated with the movie’s future box office.

4. Putting it All Together

To implement our model, we took the following two steps. First, we used a forecast based on the past history of the people making the film. This forecast considers the past histories of the directors, the producers, the screenwriters and the primary cast members. These people formulate and implement the movie concept. This forecast represented the movie’s appeal. The procedure for constructing this forecast is outlined in the next section of this paper.

The next step employed the intent-to-view measures. Beyond the mean intent-to-view, we considered the non-linear relationship with actual viewing behavior as well as the entire shape of the distribution of intents. We used intent-to-view measures taken from a
sample of undergraduate students that represented the target market for most of the films that we analyzed.

We conducted these measures in a series of experiments. We recruited undergraduates from a student pool at the University of Florida. In each of our experiments, respondents we gave respondents a one-page description of the film including the script synopsis and a list of people involved in making the film. After some initiation and warm-up questions, the respondents were given written information about the film. The respondents then provided stated intent-to-view the film. Next, we showed the respondents a trailer or several trailers of the movie. Then we collected the intent-measures on a nine-point scale. These measures were used in this study to forecast future box office.

Following exposure to movie trailers, we derived the intent distributions. Each experiment was done before the films were launched so that no respondent had specific knowledge of the films beyond what we might provide. A total of 51 movies with domestic box offices that totaled over $1M were used to estimate model our model. Sample sizes for the corresponding intent-to-view distributions varied from as little as 33 to as many as 164 students, depending upon the movie, though most were in the 70-100 range.

We then waited several years for the films to run through their entire life cycle. At the end of that period, we estimated the relationship between the intent-to-view and the actual observed box office for the films.

We estimated the model using least squares estimation and table 1 provides the results.

### Table 1: Estimation Results

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<th>Dependent Variable: UBO - Unexplained Box office ($M)</th>
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<th>Mean Square</th>
<th>F Value</th>
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| Corrected Total | 71385.244056

R-Square 0.290151  C.V. 515.4128  Root MSE 32.835100  UNEXPL Mean 6.3706417

<table>
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</table>
We found that the model provides excellent box office forecasts. At that point, we collected data for several new soon-to-be released films. We made the forecasts public to several newspapers and our results were very good. Our paper contains details.

**Project 2: Forcasting Box Office Before the Film is Made**

The last section made used of a forecast that was based on the people making the film. This section outlines the project that developed a procedure for constructing that forecast. Details can be found in another paper of mine. This project focused on very early forecasting for new products. These forecasts are made before the development of a new product concept or when a new product concept is not a good predictor of ultimate success. The project’s approach was to develop a forecast that would be useful for new product development that involved development teams where data existed on the performance of prior projects involving individual members of the current team.

The objective was to forecast the potential of motion pictures before the script was

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4 Shugan, Steven, “Forecasting the Box Office of New Films Before They are Made”, University of Florida Working Paper
completely finished or during the early development phase. This research adopted a team evaluation approach (TEA). The TEA model made early predictions from information about the past performance of the current new product team members. The TEA model provided a method for early forecasting based on the attributes of the people making the new product rather than the attributes of the new product itself.

The paper focused on the motion picture industry where script synopses, unlike product concept statements, are inadequate predictors of the ultimate success of new films. Moreover, the scheduled production process and the inability to re-design failed products, enhance the urgency of very early forecasting. With filming on a tight schedule there is insufficient time for market research. With the cast only under contract for a short period of time, it is often difficult to modify a film after it is produced. Hence, forecasting after the completion of the project is less desirable than in the case of packaged goods where re-design is a relatively easy task.

For the motion picture industry, this paper presents an approach for predicting the success of new films before production begins. By evaluating the team, rather than the movie itself, this paper can make predictions at a very early stage before major commitments and financing have been finalized. Moreover, these early forecasts can help in the process of selecting among myriad possible production projects.

This paper examined four measures of individual potential based on past outcomes. As it turns out, the average past performance of a team member is not a good predictor of the current project’s success. The best past performance is a much better indicator. However, let us described all four measures investigated in the project.

The first measure was the mean past outcome, i.e., the mean outcome of all past projects for an individual. The second measure was the MPO, i.e., the outcome of the best past project for an individual. The third was the mean squared past outcome, i.e., the mean squared outcome of all past projects for an individual. The fourth and last measure was the number of past projects.

The empirical analysis used the past outcomes for the important people in the film’s production process. The analysis revealed that it is possible to explain about 27.8% of the variance in the film’s box office with only team member histories (i.e., a total of only four variables). By including a measure of marketing effort, the analysis revealed that it is possible to explain about 40.2% of the variance in the project outcome. Hence, the TEA model provided considerable promise for providing forecasts at a very early stage that may be very helpful for making decisions very early in the new product development process.
I found that the best prior film, for screenwriters and directors, best predicts the success of their current film project. This finding is particularly true for screenwriters. I find that screenwriters may have little ability to avoid failure because many factors beyond the script may cause failure. However, a good screenplay is necessary for a successful film. Therefore, the best prior film, for a particular screenwriter, most accurately represents the potential of the screenwriter.

I found that the average past performance or squared past performance, of prior films associated with actors and producers best predicts the success of their current film project. Putting all of these variables together, I was able to explain about one-third of the variance in new film box office performance before the script is written. Although I would like to explain more than one-third of the variance, the accuracy of the forecasting model can be very helpful to management because the forecast occurs at such an early stage in the new product development.

I hope the findings in this paper stimulate additional research in both the motion picture industry and on the topic of the very early forecasting of new products. I believe the motion picture industry reveals a large number of interesting marketing problems often present in the service sector. I also believe that the findings in this paper illustrate that very early forecasting of new product success is possible.

### Project 3: Examining the Impact of Seasonality on Film Introductions

The third and final project, that we will discuss here, examined the impact of seasonality on film introductions. That project considered how seasonality impacts the introduction of new products using motion pictures as a case study.

Nearly every product displays some seasonality. The objective of this paper was to make a first attempt at providing a theoretical foundation for modeling seasonality and

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illustrate its usefulness in strategy formulation. In particular, we wanted to know how seasonality impacts the best release strategy for new motion pictures.

We modeled seasonality as a time transform so that during high seasons, time moved faster than observed time. The time-transform method accelerated sales during the peak-season and decelerated sales off-season. The consequence was a complete change in the life cycle that shifted sales to different periods.

Given our time-transform method, it appears as if seasonality merely accelerates or decelerates box office receipts without a major influence over total box office receipts. Given an infinite run, for the film, that might be true. Were a film to run for five years, for example, the timing of the introduction might not impact total box office. However, exhibitors will drop films when their box office falls below minimal levels. Hence, the absolute box office does matter because the tail part of the life cycle is truncated with exhibitors drop the film. Hence, the launching decision impacts the actual life of the film because it determines how long exhibitors will show the film.

Our time-transform method allows adjustment for seasonality that goes beyond merely increasing or decreasing sales during the seasonal periods. Our method has several advantages. First, it allowed changes in the movie’s aging process during its life, which fundamentally changes the life cycle for the film. Beyond correctly accounting for aging, our time-transform method has another advantage. It allowed us to parsimoniously incorporate seasonal patterns that are known from prior years into the forecasts for a current year. Finally, our method had the advantage of being applicable to any dynamic model, without changing the foundation of the original underlying model. Hence, the method remains loyal to the underlying dynamic model of the market.

As an case study, we used our method to study seasonal variations in the motion picture industry during the late 1990’s. We used two dynamic models. One was the exponential model for box office and the other was the Bass diffusion model for box office. Combined, the two models describe the box office of nearly all motion picture studied.

The analysis revealed several important implications for the release of new films. We, for example, showed when it is best to launch in a current low season and when it is best to wait for the next high season. When the motion picture is expected to experience most of its box office during the first few weeks, it is better to launch immediately. When the motion picture is expected to have a slower rate of decline in sales, it is usually best to wait to the next high season. However, extremely slow rates of decline, which rarely occur among motion pictures, can sometimes be consistent with an immediate launch strategy.
In general, we found that the expected shape of the box office is also very important for timing releases. The box office can have one of two patterns. First, the box office can exhibit an exponential pattern. In this case, the film reaches its peak box office during the first week (i.e., a typical pattern for motion pictures) and then declines. The second pattern is Bass diffusion. In this latter pattern, the box office increases for several weeks and, then, begins to decline.

For an exponential pattern, the following strategy is best. Distributors should either launch when the film is complete or wait until the next high season, but not launch in the interim period. Which strategy is best depends on the rate of decline, as noted earlier.

When the pattern is bass diffusion, in contrast, and sales are expected to grow because of word-of-mouth and, then, decline. With this second pattern, it is often better to launch just before the high season to take advantage of the season. It is better to establish positive word-of-mouth in the off-season, so that the seasonal effect will be stronger. Here, we should time the film’s introduction so that growth begins in the off-season, but the majority of sales occur at the beginning of the peak-season. This strategy moves sales forward while still allowing the product to enjoy a boost from the peak season.

Beyond the expected growth rate, we also find that the length of the product’s life is also important. When we are just past the peak of the season, then a very short life suggests launching now because the short life catches the end of the season. A very long life also suggests launching now because the product lasts into the next high season. An intermediate life suggests waiting where the optimal wait depends on the length of the life. Generally, the longer the life, the shorter the optimal wait.

In the empirical section of the paper, we compared our theoretical predictions to observed box office results. The results are generally consistent with the theory. In addition, we derived the seasonal pattern for the industry for 106 weeks using, over 6000 observations. The analysis concluded that there are 12 different levels of Seasonality.