Hollywood is an Uncertain Place: Kim Basinger's ordeal and complexity in the movies

Arthur De Vany
Institute for Mathematical Behavioral Sciences
University of California, Irvine*

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Kim Basinger is a beautiful and talented actress. A sunny Breck shampoo girl with a dark side, she became famous for her Playboy exposure and bad behavior in *The Marrying Man*. She was brilliant as the pliant money- and sex-hungry victim of Mickey Rourke's stockbroker in *9 1/2 Weeks*. It is easy to see why the producer of *Boxing Helena* would offer her the lead role. But, she declined. The producer claimed they had a deal and sued.

The bitter irony for Ms. Basinger is that, like the character she declined to play in *Boxing Helena*, her distinguished career was dismembered and left in bankruptcy by a jury whose admiration for her approached the lethality of Helena's lover. What the jury came to believe was that *Boxing Helena* would have earned a great deal more money had Ms. Basinger played the lead role. The irony is that they set such a high value on her talent and reputation that they granted an award of damages to the producer that forced her into bankruptcy. The experts brought in to testify about damages, the lawyers

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*This article is based on my forthcoming book, *Chaos in Hollywood*, and research papers in the References.

in the case, and the jury that awarded damages all were wrong. They didn't understand complexity in the movies and why that makes Hollywood such an uncertain place.

Why is an apparently reasonable claim that a movie like *Boxing Helena* would make more money if a star such as Ms. Basinger appeared in it instead of an unknown actress false? It is false because the movies are a complex system and you can't make these kinds of predictions about a complex system with any reliability. A complex system defies the conventional logic of expectations that most people wrongly bring to the table when they think about these kinds of problems. Hollywood is an uncertain place because the movie business is a blend of order and chaos—what we now call a complex system.

Hints of complexity

Ancient industry wisdom has it that motion picture audiences and box office revenues are starkly uncertain. It is only with the development of the sciences of complexity that we can begin to grasp what every producer awaiting first-weekend box office reports about his movie has always known—the business is terrifyingly uncertain. Or, as Producer Robert Evans said, "A motion picture is like a parachute jump. If it doesn't open, you are dead."

To a complexity scientist, these industry folk theorems are the signs of a complex adaptive system. The critical sensitivity of box office revenues to the opening—the parachute jump—is the mark of the sensitivity to initial conditions characteristic of deterministic chaos. If movies show sensitivity to initial conditions—the butterfly effect—then even small differences in initial conditions, like how your popcorn is buttered, or what other movies are playing, or a fall in the exchange rate, might produce large changes in the aggregate when the non-linearity in the system unfolds. "Butterflies at the opening" describes not only how the producer's stomach feels, it captures the very essence of the uncertainty that infects motion picture revenue dynamics because they are non-linear and sensitive to initial conditions.

Another bit of movie folk wisdom is encapsulated in screenwriter William Goldman's conclusion that in Hollywood "No one knows anything." Making motion pictures is a creative act and creativity is something that emerges from the zone between order and disorder. A motion picture is "interesting" if it finds this zone. And it lights up the screen with magic when it puts the right characters, themes, and events together in the critical region where there is a tension between order and chaos. Even sequels or remakes are novel because of this creative tension.

A motion picture audience can't tell you whether they like a movie or not until they have seen it. Even then, their response may depend on the conditions: how they felt that day, whether the crowd laughed in the same places they did, even how their popcorn was buttered. The response of audiences to motion pictures is an emergent process whose aggregate behavior cannot be deduced from the responses of single individuals.

This is true of box office revenue as well. Motion pictures play over time and their box office revenues evolve through the dynamic interactions among many individuals following their own rules. When movie goers see a movie they like (or hate), they make a discovery and when they tell their friends they set a complex information dynamic into motion—the information cascade. Because the information cascade is non-linear and random and human beings are so adaptive, there is no telling where it will go. That is why no one knows anything.

A lot of this flies in the face of the way the conglomerates who own the studios now are trying to manage the movie business. Formulaic narrative structure, "high concept" movies, bankable stars, overwhelming hype and self-promotion, ancillary tie-ins, and the big budget-, high special effects- "event movie" are the new model for managing Hollywood. They hinge on the premise or hope that the audience can be manipulated into a kind of herding behavior and follow one another to the box office.

Something like herding is going on when movies like *Jurassic Park* or *Independence Day* draw huge crowds. On the other hand, it is clear that the audience has a mind of its own when special effect- or star-vehicle movies like *Daylight* featuring Sylvester Stallone or *Last Action Hero* starring Arnold Schwarzenegger flop. Stars and special effects offer no guarantees.

It is equally clear that audiences do not choose movies at random, for then every movie would do about as well as every other. Real movie audiences are made up of real people who exchange information and interact with one another in fairly simple but unpredictable ways. But, it is not all random and unpatterned.

In the aggregate (so my research shows) audiences exhibit complex behavior that is poised somewhere in a critical zone between herding and randomness. It is this behavior—movie audiences playing with order and chaos—that makes Hollywood such an uncertain place. The uncertainty goes beyond mere probabilities. Hollywood is a place of false expectation, dashed hopes, and unbelievable success because the movies are a complex system.

If this sounds like another Santa Fe Institute scientist claiming to see complexity in yet another area of human and social behavior, that is partly true. For the past few years, I have been looking at the motion picture industry, focusing on the role of information cascades as a source of complex behavior. None of the research was actually done at the Institute (though one of the papers was presented there), but many of the ideas originating at the Santa Fe Institute played an important role in the development of my thinking.

Pushing and herding

Suppose you are thinking about going to the movies. You have heard nothing good about Sylvester Stalone's *Daylight* and all your friends rave about *The English Patient.* Which one would you choose? If you are like most people, you will probably choose *The English Patient.* "Probably" is a key word, because you could choose a third movie, or choose not to go at all. People rely on information from many sources—movie reviews, friends, advertising, who is in the movie, who made it, and so on. Information reaches people in different sequences and the context in which it is received is unique to each individual. Every individual has a unique life and history and places a unique interpretation on information. Yet, human beings evolved as a species and we share attributes and behaviors honed over millions of years of evolution. We also live in a society where we share certain common values and face similar problems.

"Deep" themes related to reproductive success, food, security and so on are encoded in all of us. (As the father of evolutionary psychology, Darwin could have been a great director. Steven Spielberg may be his best student in the way his movies evoke the "fight or flight" responses deeply encoded in us all. It's shallow and manipulative, of course, but we can't help ourselves in the way we respond after our ancestors spent 3 million years evading predators on the African savannah.) So, in any population of movie goers there is a source of order—our shared preferences, evolutionary strategies, instinctual responses, and culture—as well as sources of variety and randomness—our individual uniqueness and the way we are immersed in the flow of information. These are the sources of complexity in motion pictures.

How many people go to a movie among the many that are playing depends on the random interactions among many individuals who are unique, but share similar interests and strategies. If individuals aren't similar to one another in some ways, then their behavior would be completely random and unpredictable. They would behave like a crowd of people randomly pushing one another until they reached the box office at a theater showing any film.

On the other hand, if they are too much like one another, or if they become so strongly connected that they act like a mob, then movie-goers would exhibit "herding" behavior. They would behave like cattle stampeding, following one another to one box office.

A system of movie-goers that has the right balance in their similarities and differences would show behavior that falls in the complex region between unpredictable randomness and herding. We call such a system a complex adaptive system—a system that is poised in the critical region between order and chaos. It is in this region that motion picture audiences live. How do we know this? We can see it in the dynamic patterns of box office revenues. And, we can see it the way box office revenues are distributed over movies. We also can see it in the strategies studios use to try to induce mob-like herding in the audience.

Dynamic patterns

In our article "Bose-Einstein Dynamics and Adaptive Contracting in Motion Pictures," David Walls and I [3] showed that when the audience sees a movie and transmits information they set in motion information cascades that lead to complex box office revenue dynamics. Given a favorable response, an initial audience can be leveraged into greater subsequent revenues. Thus, an early advantage can be exponentially leveraged into a massive advantage later. Given an unfavorable response though, an early lead can turn to swift failure. By modelling the motion picture market as a tournament between many films, each vying for an audience, and looking at the way audiences were attracted to films we were able to show how the probability that a randomly chosen movie-goer would go to each movie evolved over the course of a film's run.

What we found was that these probabilities behaved in a way that showed that the audiences maintained a balance between pure randomness and herding. We didn't find evidence that movie-goers were like particles interacting randomly with one another; there was too much week-to-week correlation in the size of a movie's audience to support that kind of interaction, and the distribution of revenue among movies did not agree with independent interaction (the revenue distribution would be log-normal, which we rejected). Nor did audiences always herd to one or a few movies, though just a few movies did earn the bulk of the revenue.

The size of the opening predicted neither success nor failure. In the revenue trail left by movies that failed early, one could see the traces of the opening throughout their run (it remained a dominant part of their total revenue). But, there was no trace of the opening in the revenue track of those rare few movies that had "legs" and ran for many weeks and earned the dominant share of all the revenue (in these cases, the opening revenue was a small part of their total revenue).

In putting all the pieces of evidence together, we concluded that movie-goers behaved like particles randomly falling into urns or clustering in space in the fashion described by the Bose-Einstein statistics. All possible distributions of movie-goers over movies were equally likely, but once the symmetry was broken and particles began to pile up on a few movies, the size of their audiences began to diverge rapidly from the others.

It was evident that film-goers were learning what movies they liked and transmitting information to one another in such a way that the probability that they would choose a movie depended, in a non-linear way, on all the choices that had already been made. A random, non-linear, recursive process was shaping the evolution of choice probabilities—we called it the information cascade. The probabilities were evolving in such a way that the more people that had already seen a movie, the more likely, but not certain, was that movie to be chosen by the next wave of movie goers. When only a few had seen it, it became less likely that any one else would.

We even found the Yogi Berra paradox in the movies. Yogi is reputed to have said, "Nobody goes there anymore because it is too crowded." Some movies that had a large audience when they opened disappeared so quickly that only a large negative information feedback effect could explain it; these movies found the Yogi Berra fixed point of the non-linear information cascade.

Which movie would first attract the early viewers and engage the information cascade could not be predicted. All we could successfully predict was next week's revenue from last week's. (Short-term predictability with long-term unpredictability is a feature of complex systems.) There was no way to tell how well a movie would do from the number of theaters it opened in. Genre meant nothing. Big action films, flakey movies, and even semi-documentaries bubbled up to the top. The presence of a star was correlated only with the number of openings; but star vehicles could disappear rapidly if negative information cascaded from the large opening crowd.

Complexity and power laws

A good deal of Santa Fe work has shown how and why power laws are a feature of complex systems. Stuart Kauffman and Sonke Johnson [5] argued that self-organized networks tend to evolve to the critical region where they are poised and highly adaptive. In this region, particles communicate via power laws and their dynamic patterns mimic their communication. Per Bak and his colleagues have developed models of self-organized systems and they have shown that these systems reach the critical region, where they too exhibit power law behavior [1]. Earthquakes, avalanches, and many natural processes exhibit power law behavior.

What is a power law? The Richter law for the magnitude and frequency of earthquake shocks may be the best known power law. It says the magnitude of shocks is inversely related to their frequency; the form is $Magnitude = 1/Frequency^{\beta}$. Power laws are all around us, in the music of Bach, in pink or "flicker" noise, and there are traces of power law variation in healthy heart beats, brain activity, stock market price changes, and income distributions.

There is evidence of power laws everywhere in Hollywood: in the way motion picture box office revenue declines as the film's rank declines, in the length of a movie's run, in the market shares of the major distributors (studios), and even in the life expectancy of a star's career (the screen lives of movie stars, like real stars, flicker).

You can imagine what a power law distribution of motion picture revenue looks like if you think of the shape of the prize distribution in a sports tournament. First place gets the lion's share, second gets much less than first place, and third place gets a proportionately smaller prize. The differences between prizes lessens at the lower ranks. This kind of prize distribution also holds for movies. Figure 1 shows the relationship between a movie's total box office revenue and its rank among the 50 movies simultaneously playing in *Variety's* Top 50. The ski slope shape identifies it as a power law, where the box office prize declines as a power of the reciprocal of rank.

The huge earning movies are located in the long, slender tail to the right. The bombs are located under the thick tail to the left. The ski slope shape indicates that movies that earn low revenue are much more prevelant than movies that earn high revenue. The revenues earned by those few movies that ran beyond 8 weeks and earned over 80 per cent of all the revenues in our sample of 300 motion pictures also followed power laws.

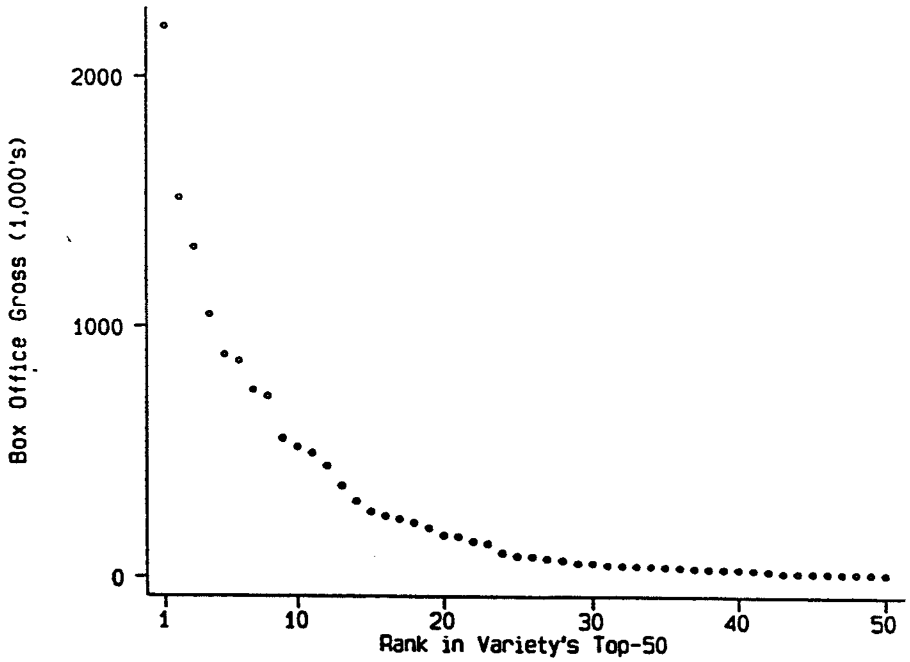
Not only box office revenues, but the length of time movies live on theater screens is distributed according to a power law. The average motion picture spends less than 5 weeks in Variety's Top 50 motion picture list. The survival probabilities decline as an inverse power of the length of a movie's run, as the picture in Figure 2 shows.

The finding that movie revenues and lives are power law distributed not only is evidence that movies are a complex system. It has profound implications for the kind of uncertainty that exists in the movies.

Uncertainty at the box office

The power law has the distinctive shape of a ski jump and a producer whose movie is about to open is right to feel that he just dropped out of the gate to begin his run down the perilous drop of a ski jump. If launching a movie sounds as risky as a ski jump, it is—the risk is in the shape of the curve, its height and steep slope. To get a feel for the magnitudes of the risks inherent in power laws in motion pictures, Walls and I estimated the revenue distribution and product life distributions. They are both power law distributions of the

Figure 1: Box Office Revenue and Rank



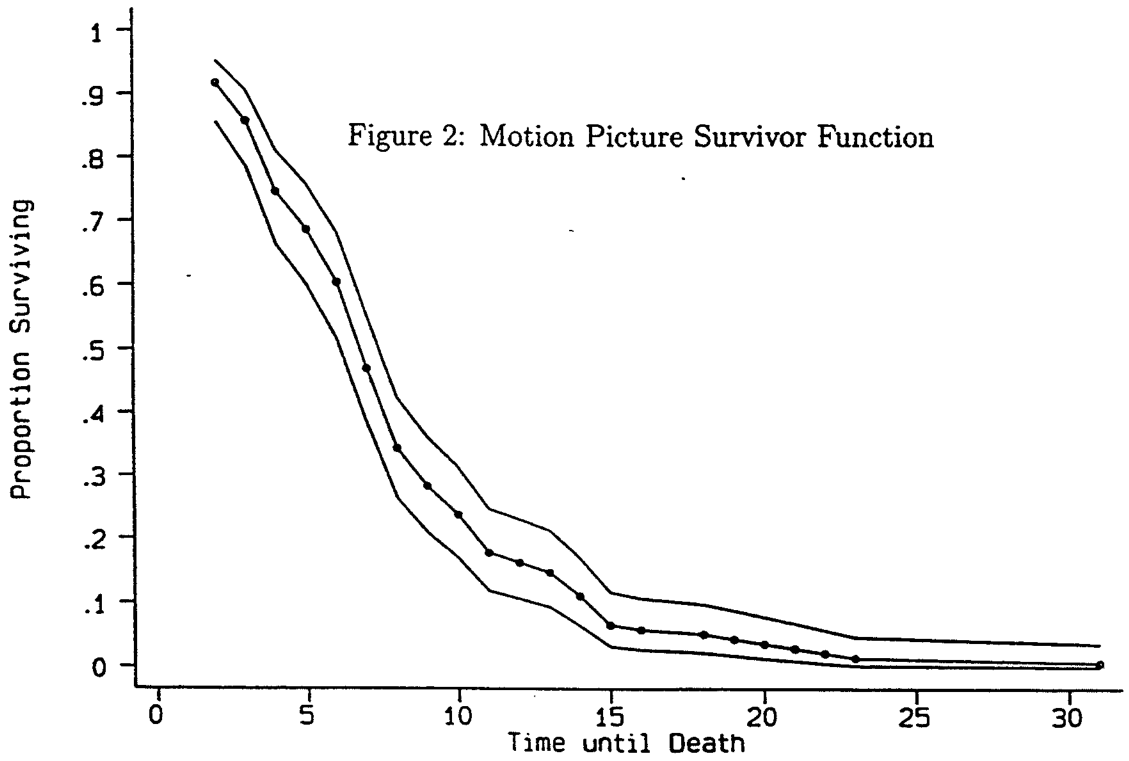


Figure 2: Motion Picture Survivor Function

Survivor Function Estimate with 95% Confidence Bands

Table 1: First, Second, and Third Moments of Revenue and Life Forecasts

Moment	Revenue	Run Life
Forecast (expected value)	$1.90\ 10^{6}$	4.98
Second Moment	$5.07\ 10^{13}$	79.35
Third Moment	$1.93\ 10^{21}$	2222.25
Variance	$4.64\ 10^{13}$	53.20
Relative Error	$2.38\ 10^{7}$	10.67

kind called Pareto laws. The probability density function of a Pareto law is:

$$f(x; A, r) = A^{r} r x^{-(r+1)}$$

Our estimate of r is 0.2394 for the revenue distribution and 0.7486 for the product life distribution. A is a scaling parameter related to the minimum outcome (it's unimportant now and I'll discuss it later when I take up star power).

To illustrate the deep uncertainty in motion pictures, suppose you are a producer pitching your latest movie project to a studio executive. You want to forecast the box office potential of your movie. Suppose you know the parameters of the box office and product life Pareto distributions. Let's do the pitch by calculating the theoretical expectations of the revenue and run distributions to forecast for the studio executive the expected revenue and run life. The expected values are $1.9 million for box office revenue and 4.98 weeks for the length of the run; these are listed in Table 1.

The only reason this picture would be made is because of the variance in the distribution; a movie that earns two million at the box office can't recover its cost (the revenue is the domestic box office only, videos and foreign sales might raise its chances, but not by much). The studio executive must be a risk-taker or most movies would never get made. The Pareto power law of movie box office revenue has all the variance a risk lover could ask for.

The probability mass in a power law distribution does not pile up around a central location—it is scattered all over the range of possible outcomes (check Figures 1 and 2 for this). Because there is no central tendency, the higher moments of the distribution, which are related to its variation, explode toward infinity. This is true of the second and third moments of revenue and run life, as shown in Table 1. The third moment of revenue is 15 orders of magnitude (powers of ten) larger than its expectation; for run life, the third moment is over 400 times larger than the expected value.

Most people don't think in terms of moments, so I have calculated the variances of both variables and the ratios of their variances to their means, which I have labelled the relative errors. Both are huge—the variance of box office revenue is over 20 million times larger than its expectation and the variance of run life is just over ten times its expectation. With potential errors of this size, our hapless producer can have no confidence in his forecasts. On the other hand, the large variance offers the studio executive the upside risk he is looking for.

Movies require non-normal thinking

Using the variance in the example is somewhat misleading. Nearly all the uses that are made of the variance reflect an appeal to normality. Movies do not follow normal distributions, they obey power laws. The variance is defined as the sum of squared variations about the mean—the central location of the distribution. A power law has no central location. A normal distribution does. A power law is like LA a city where there is no center and you lose a sense of distance because every neighborhood is the same. A normal distribution is like NYC a city that has a center and whose distinctive neighorhoods give you a sense of movement and scale. For movies, you have to think LA, not NYC. You have to try to keep from making the mistakes that "normal" thinking—reasoning based on normal distributions—leads to.

Power laws differ from normal distributions in two ways that are important for understanding the movies. First, the variation is not symmetrical in a power law distribution like it would be in a normal distribution. (In fact, a power law may not have a finite mean and the variance or higher moments may not exist.) Because the distribution slopes downward from left to right, movies have a low probability of earning high revenues and a high probability of earning low revenues. This is completely different from a normal distribution where high and low earnings away from the mean are both improbable.

The other property of power laws that confounds normal thinking is that no matter how finely you partition movies into categories, they have the same distribution. This is a familiar property of complex systems. It is called self-similarity on all scales. You get a power law if you look at only those movies that made more than $15 million box office gross or if you look at those that made less than $1 million, or any other interval on the scale. Self-similarity will be there even if you break movies out by genre, or star, or the size of the production budget.

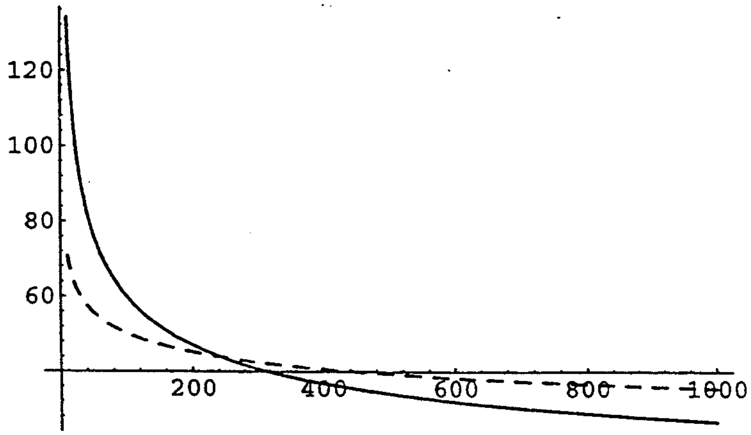
Another characteristic of the movies is that week-to-week revenue changes are power law distributed. In this respect, movie revenues do a random dance like stock market prices. The forecast errors grow at a power of the length of the forecast into the future. You can predict next week's box office reasonably well from this week's, but the error grows as a power of the distance of the forecast into the future (the error is on the order λn^{γ}, where λ is a scaling factor and n is the time depth of the forecast). Exponentially growing forecast errors are evidence of chaos, power law growth of error is evidence of complex behavior. The movies, like the weather, do show some degree of near-term forecastability.

Star power and risk

If a movie can't get made when its prospects are equal to the average return, then it is easy to understand the terror of the box office. A studio executive has to live on the risk and pick movies that will make it to the upper end of the distribution. Because the power law distribution has most of its mass at the low end, where the losers and bombs are located, the upper tail is slender. The chances of picking a movie that will land in the slim upper tail of the distribution are small and the chances of picking a loser in the fat lower tail are large. The hit movies are at the far upper end of the distribution and there are only a handful of them (in our sample, the top four movies earned 20 per cent of total revenue, 20 per cent of the movies earned 80 per cent of all revenues).

The only way to exert any control over risk is to find a way to twist the distribution so that less of its mass falls at the low end and more of it falls at the high end. This preserves the risk, which is essential if any movies are to get made, but it changes the odds. Think back about the Pareto law and its parameters—they are r and A. Together, they determine the position of the power law. They do not alter its basic shape, but they can twist it to a new position. To make the odds more favorable, the studio executive

Figure 3: Twisting the Power Law



would want to pick motion pictures that alter r and A so that the power law twists from the solid to the dashed curve in the manner shown in Figure 3. The executive wants to lower the height of the power curve at low revenue outcomes and increase it at higher outcomes, the equivalent of making the ski jump less steep.

To favorably alter risk, the power curve must be made less steep, which involves finding movies with smaller r values and higher A values. The parameter A in the Pareto law is the minimum outcome. If a star can get a movie booked on more theater screens at its opening, then a higher A is assured (as long as r is not changed). But, r is up to the movie and the audience and no amount of star power can overcome the critical judgment of the audience. If the movie's r is high, the revenue curve will be steep (A is raised to the r power and r determines the slope, given A). So, it is combinations of A and r that determine the movie's chances at the box office.

Some combinations are lethal and we can think of many movies with great star power, stories, or special effects and expectations that disappeared quickly. These are movies with big As (star power) and big rs (poor receptions). Together, they make the power law so steep that a movie launched on the curve goes into free fall and dies. The executive wants a movie with a big A and a little r; then the power curve is twisted in the right way, lowering probability mass in the lower tail and raising it in the upper tail.

That is the whole game, but no one can play it and predict how well they will do. The A parameter is more easily managed; just get the movie on lots of theater screens. This means attracting theater booking agents with stars, advertising, stories, directors, whatever they are drawn to. But, since they don't know what will work either, all this can do is put a floor under box office revenue equal to box office gross in the opening week or two. This floor comes at a great cost: heavy promotional expense and millions of dollars in pay to the star. The rest is up to the audience and the movie and the information cascade which is the underlying force that makes the distribution a power law.

Power laws and 'Winner-take-all'

A system that lives by a power law contains a mixture of structure and novelty, like a Bach fugue. Earthquakes follow power laws because the earth's mantle stores the past history of plate movements while it accumulates random new strain. The Bose-Einstein process which we found movies to follow has just this sort of mixture of memory and novelty. Memory is stored in the number of people who see and transmit information about a movie, and novelty is present in the individualistic ways movie fans turn this information into choices.

The audience information network gets organized on the border between order and chaos because that maximally processes information. When it is so organized, individuals communicate according to power laws. With power law communication at work, some bursts of communication reach far out into the network, but most bursts remain localized. When these bursts cascade widely over the network, they produce avalanches of attendance. When this happens, it propels the movie into superstar territory where it draws such a large audience that other films fail and the movie tournament becomes a game of winner-take-all.

Unboxing Ms. Basinger

Given all I've said about the uncertainties in the business, it is clear that the jury made many errors in awarding damages against Ms. Basinger for refusing to be put in Helena's box (or the attorneys failed to tell them what they needed to know to avoid their errors). On purely statistical grounds, Kim may have brought a big A value to *Boxing Helena*, but that could be good or bad, depending on r. If r were large, the movie's run would be a fall down a steep ski jump. But, there is much more to it than that. Here are some of the things an expert witness who knows what we know at this point about complexity in the movies should have explained to the jury (and what every studio executive should know).

1. There is no single cause in a complex system. Kim's non-appearance is only one of immeasurably many elements of the system. The jury could no more trace the final result, in revenue or other terms, of the movie's run back to a single factor than they could trace a particle of water in a wave at the seashore to its location a mile out into the ocean.

2. The butterfly effect is real. The world was a very different place when the movie was released from what it was on the date it was going

to be released with Kim in it. The non-linearity of the information cascade would take the movies to very different places given even slight differences in initial conditions.

3. Past is not future. What Ms. Basinger's other movies earned is irrelevant because *Boxing Helena*, like every other movie, is unique. Taking averages over unique movies is meaningless. Further, complexity means that average revenue from the past is a poor predictor of tomorrow's outcome. The right analogy is the weather; the average weather in Santa Fe is a poor predictor of tomorrow's weather in Santa Fe. And only a fool would use the average weather in Santa Fe to predict tomorrow's weather in Denver or the average of Ms. Basinger's past movies to forecast revenue for *Boxing Helena.* (This is a story movie agents might not want to hear.)

4. Motion picture revenues do not follow a normal (bell-shaped) distribution; they follow power laws. Because of this, the jury should have been told that:

    (a) An average taken over the past, say, over her prior movies, is not an expectation. A power law has no characteristic scale and its expectation need not exist.

    (b) Even if the theoretical expectation exists and can be estimated, the variance is essentially infinite. An estimate of the expectation completely lacks precision and contains no information. It is completely misleading as a forecast of the outcome.

5. The information cascade can kill. Ms. Basinger's appearance in *Boxing Helena* might have gotten it booked on more screens initially. For two

reasons, this higher initial exposure might have propelled the movie to an even earlier death and smaller, not larger, revenues.

   (a) The unfavorable information wave that disseminated about the movie would have begun from a larger initial audience. The negative information cascade would have been more powerful and cause the audience to decline more rapidly.
   (b) Booking the movie on many screens dilutes the revenue over more theaters, putting more of them below the critical level at which they drop the movie.

6. Last, and the most counterintuitive result of all: because motion pictures are a critically organized system, movies can die for no apparent reason. The market may be in relative stasis for a period of time, but the equilibrium can be punctuated with inexplicable extinctions on every scale. A movie can die just because of the way the system operates, and its death cannot be traced to any intrinsic qualities of the movie itself.

Herding strategies and the war of attrition

I'll close by hinting at some insights that complexity science reveals about the new style of management in Hollywood.

Under their new management philosophy, studios seek to reduce risk and complexity by directing the information cascade through unprecedented promotional expenses (which often equal the production cost of the movie). If the movie engages the audience and a positive information cascade, the promotion can propell it to superstar status. When this happens, there is a loss of complexity in the system; it becomes more orderly and predictable, and the box office probability distribution collapses, piling density onto just a few movies. Heavy promotion and hype can drive the system to a more ordered state.

With so many studios priming the information cascade, it becomes more likely that the system will decomplexify and undergo a transition to order. The paradox is that, even though the system becomes more predictable after the transition from chaos to order, the risks become greater. We know movies are all risk anyway, given that no movie would ever be made based on its expectation. But, the event movie strategy escalates the risk because when the system loses complexity and makes a transition to orderly herding it will take most of the audience to just one or two movies and make paupers of the rest.

The executives are put at risk by their own strategy. Audiences herd just often enough to make a studio executive look like a genius, but they act with enough critical judgment and randomness to guarantee that he won't keep his job for long.

Even the studios may be at risk. In rushing to mimic the latest big hit, the studios are doing some herding themselves. We know why. Because movies are a complex system, there is some short-term forecastability in the movies—like the weather—so that the first studio to rush a spin-off of a successful movie onto the market might have a hit on their hands. But, by the time the flock of clones hits, the audience and the information cascade have changed, like storm clouds following a sunny day.

The herding game is a war of attrition—the studio that can spend the most money may have the best chance of winning. The terms of the competition keep escalating. This year's crop of "event" movies will hit record cost levels. (As far as I can tell, an "event" movie is a Roger Corman movie with a gigantic budget.) This year, an unprecedented flood of movies costing from $100 to $200 million is coming into the market in a brief time span.

Injecting this many big budget movies into the complex dynamics of the information cascade is like priming the avalanche or loading more strain onto the earth's crust. The impact of these movies and the torrent of promotion that surrounds them may drive the system to the super critical state where avalanches and earthquakes of all sizes occur. (It sounds like an Ed Woods script for *The Day Hollywood Disappeared*, and, true to Woods style, there won't be any reshoots.) A box office avalanche could take out a studio; a 7.5 Richter fracture along Hollywood's big fault lines could bring down several studios. On the other hand, it could work out just fine. No one knows.

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