Quantifying Movie Magic with Google Search

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Introduction

It's Friday night and you're thinking about seeing a movie. Your thought process might sound a little like this:

What's in theaters right now? What's that new movie my friend was just talking about a couple days ago? That trailer I saw for another film a few weeks ago looked interesting. Another movie review I read sounded promising...what should I see?

While this particular moment in time may capture a portion of the decision making process, it doesn't give us the entire story. Moviegoers are now more actively discovering and exploring their film options, and this translates to a longer, more deliberate movie research timeline.

On average, moviegoers consult 13 sources before they make a decision about what movie to see.[1]This active research and engagement is reflected in search query volume as well. **Although the number of titles released declined 9% in 2012 vs. 2011,[2] movie searches on Google are up 56% in this same period**.

Search offers an on demand, real-time source of information that can extend engagement with potential moviegoers. By understanding how and what they are searching for, we can uncover unique insights into moviegoers' awareness and intent. In this paper, we will discuss how search query patterns and paid clicks can help us in the quest to quantify 'movie magic,' and ultimately predict box office performance.

Key Insights

- The decision to see a movie is a very highly considered research process. Searches in the movie category on Google are up 56% from 2011 to 2012, signaling an increase in digital engagement and appetite for more information.

- Search provides a unique opportunity for film marketers to extend engagement with potential moviegoers. By understanding how and what they are searching for, we uncover unique insight into moviegoer awareness and intent.

- Query volume and paid click volume – in conjunction with other movie-related variables (e.g. theater counts) – can predict a film's opening weekend performance with 92% accuracy and subsequent weekend performance with 90% accuracy.

- Trailer-related search trends four weeks out from a movie release provide strong predictive power for opening weekend box office revenue. Trailer search volume on Google coupled with both the franchise status of the movie and seasonality can predict opening weekend box office revenue with 94% accuracy.

- Since 48% of moviegoers decide what film to watch the day they purchase their ticket, it's important to have a continued search presence through opening weekend and beyond.[1]

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[1] Google Social Research Study. "Understanding the Role of Social and Social Media in the Shopper's Journey, Movie Tickets." Dec. 2012
[2] Theatrical Market Statistics. MPAA 2012

I. The Quest to Quantify 'Movie Magic'

The quest to quantify 'movie magic' is certainly not a new concept. Pre-release film tracking has been around for decades, however, traditional approaches have recently come under scrutiny. With the increasing amount of information and media influences available, there are many more factors that should be considered. In addition, because so much research is done before moviegoers make the final decision to purchase a ticket, it is important to look at all the intermediate steps.

When it comes to researching a new movie, 61% of moviegoers state that they turn to online resources. More specifically, almost half are going online and searching for this information.[3] By looking at the research process through search, we obtain a more specific understanding of just how aware or how strongly they may be considering a particular title over time. These search patterns are what reveal information about moviegoer intent and how it impacts the box office.

+56%
increase y/y in movie-related Google searches

II. The Link Between Google Search and Box Office

Let's first establish the connection between search activity and box office. If search is a reflection of interest and intent, one would expect that the more movie-related search activity in a given weekend, the bigger the box office. In looking at the overall weekly box office receipts and weekly query volume on Google in 2012, we observe a strong link between the two metrics (Figure 1).

Figure 1 | Comparison of 2012 Box Office Index and Film-Related Search Index
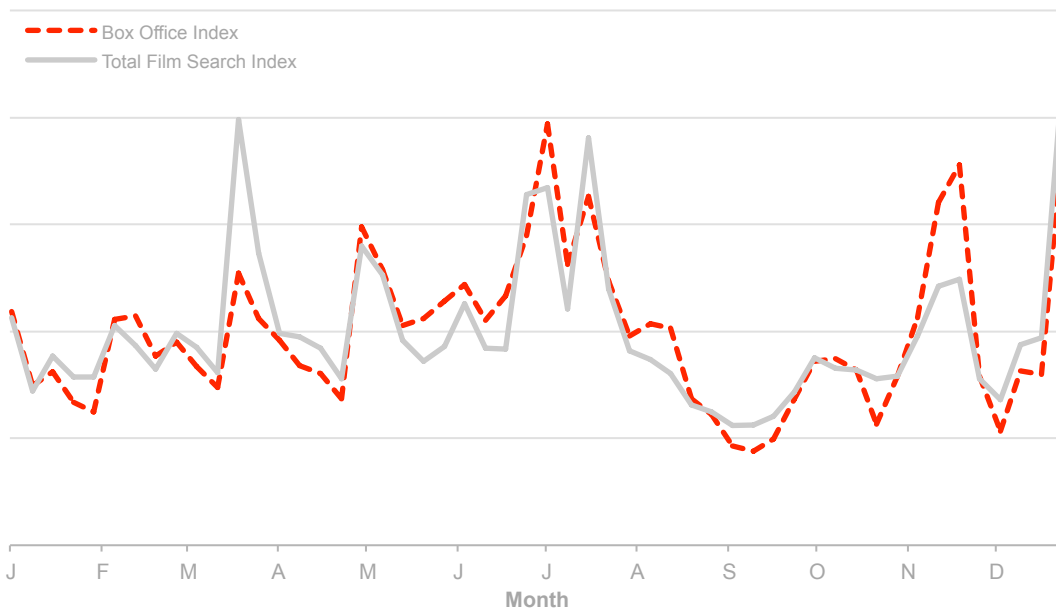
Another interesting pattern appears after we split the overall search index into film-specific title keywords[4] and generic movie-related keywords[5] (Figure 2). Film-specific title keywords spike during release week of major tentpole films, such as *The Hunger Games, Avengers*, and *The Dark Knight*. Presumably, due to higher awareness and interest levels in these films, moviegoers tend to search for the specific title instead of general movie information.

Additionally, during traditionally slow periods in the box office, generic non-title keywords over-index, signaling moviegoers' (a) general curiosity and lesser awareness of films being released during this period, and (b) broadening of their consideration set to include multiple titles.

Figure 2 | Comparison of 2012 Box Office Index, Movie-Title Search Index, and Non-Title Film-Related Search Index
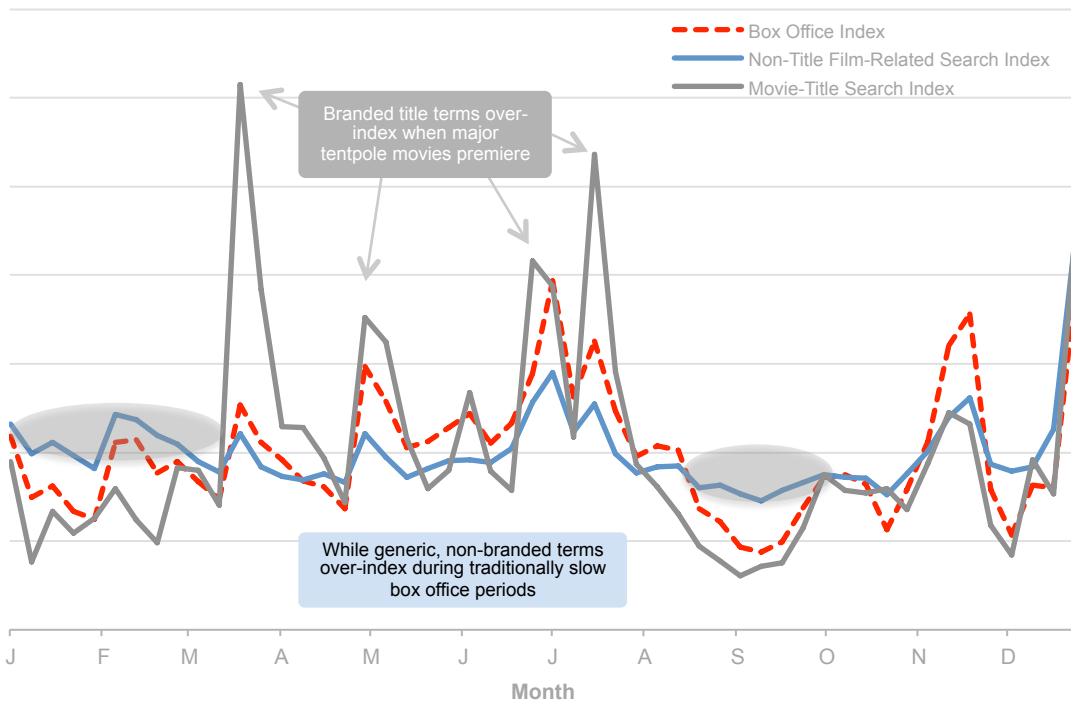
For film marketers, understanding these patterns can present a substantial opportunity. By adjusting search marketing strategies to these trends, marketers can either capture the attention of the "curious" moviegoer, or deepen audience engagement with a blockbuster title.

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[4] keywords include "[movie title]", "[movie title] trailer", "[movie title] clips", "[movie title] cast", "[movie title] tickets", "[movie title] plot", "[movie title] reviews", and other common variants related to these categories

[5] keyword categories include general movie terms (e.g. "new movies", "movie showtimes"), theater chain terms (e.g., "regal showtimes", "carmike theaters"), and online movie ticket services (e.g., "fandango", "movietickets")

# III. Predicting Weekend Box Office One Day Before: Paid Clicks Predict Tix

Opening Weekend

Now that we have discussed the link between search volume and box office performance on an overall level, we can begin to think about the ultimate question on the mind of any movie marketer: **How will MY film open?**

70%

of the variation in box office performance can be explained with movie-related search volume seven days prior to release date

Our analysis of 99 films released in 2012 shows that a film's Google search volume during the seven days prior to its opening[6] is a strong indicator. Figure 3 shows that a simple linear regression model[7] using film-related search query volume as a predictor of weekend box office performance yields an R^2 = 70%. In other words, 70% of the variation in box office performance can be explained with search query volume *(NOTE: A perfectly predictive model has R^2 of 100%).*

Figure 3 | Scatterplot of Indexed Search Query Volume and Actual Box Office Opening Weekend
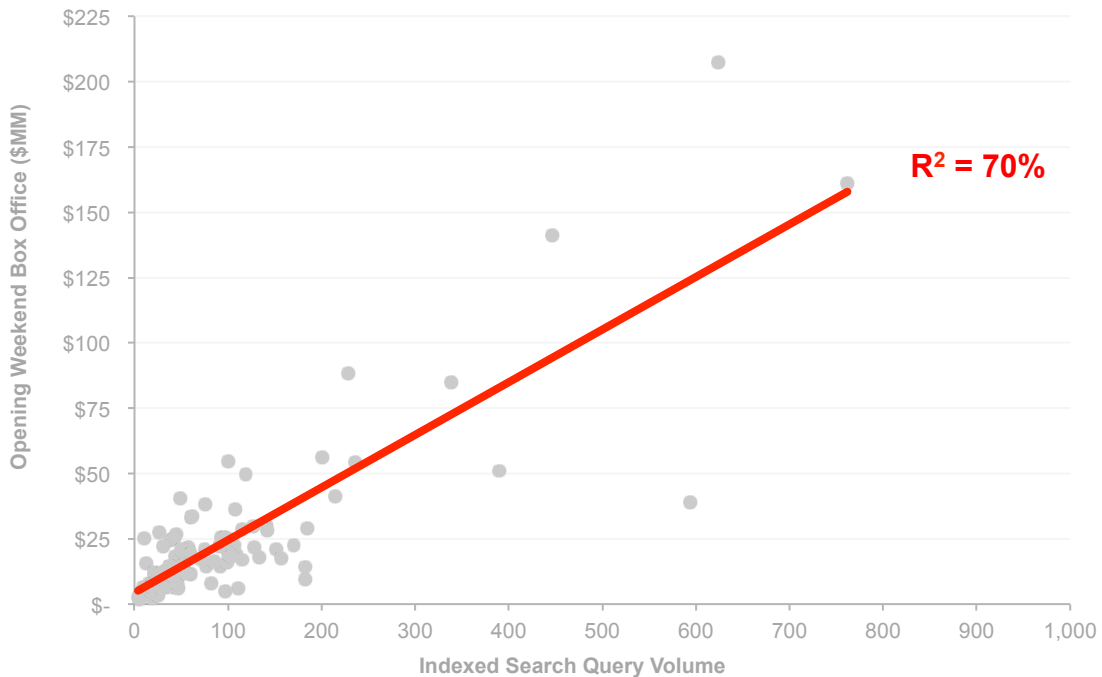
Of course, we realize that search volume alone cannot account for the entire story. In addition to search volume, search ad click volume is a key element of the prediction model as it signifies deeper engagement with a particular film. Furthermore, we examined over 30 different film variables[8] including genre, seasonality, franchise status, star power, competition, MPAA rating, theater counts, and critic and audience ratings.

Ultimately, non-statistically significant variables were dropped, resulting in a model that includes the following variables:
- **search query volume (seven-day period prior to release date)**
- **search ad click volume (seven-day period prior to release date)**
- **theater count**
- **franchise status**[9]

This model has an **R^2 of 92%**, meaning box office sales can be predicted by the combination of the aforementioned variables with 92% accuracy. From this analysis, we can conclude that in the seven day window prior to a film's release date, **if one film has 250,000 more search queries than a similar film, the film with more queries is likely to perform up to $4.3M better** during opening weekend. When looking at search ad click volume, **if a film has 20,000 more paid clicks than a similar film, it is expected to bring in up to $7.5M** more during opening weekend (Figure 4).

If a new film garners

20,000

more paid clicks than a similar film, that film is likely to bring in up to $7.5M more in opening weekend receipts

Figure 4 | Opening Weekend Prediction Model (Search Ad Click Volume as X-axis)

Beyond Opening Weekend

Movie marketers, moviegoers, and the media tend to focus strictly on a film's opening weekend performance. However, titles such as *Identity Thief* and *Oz: The Great and Powerful* have recently shown that there are plenty of box office dollars to capture after the first weekend. We found that the number of paid clicks a film garners during a Monday-Thursday period post-premiere, coupled with a few other film-related metrics, serve as strong indicators of how a film will fare in a post-opening weekend against new releases and other holdover films.

For holdover films (i.e. films in their second week or beyond), the significant variables in our regression model include:
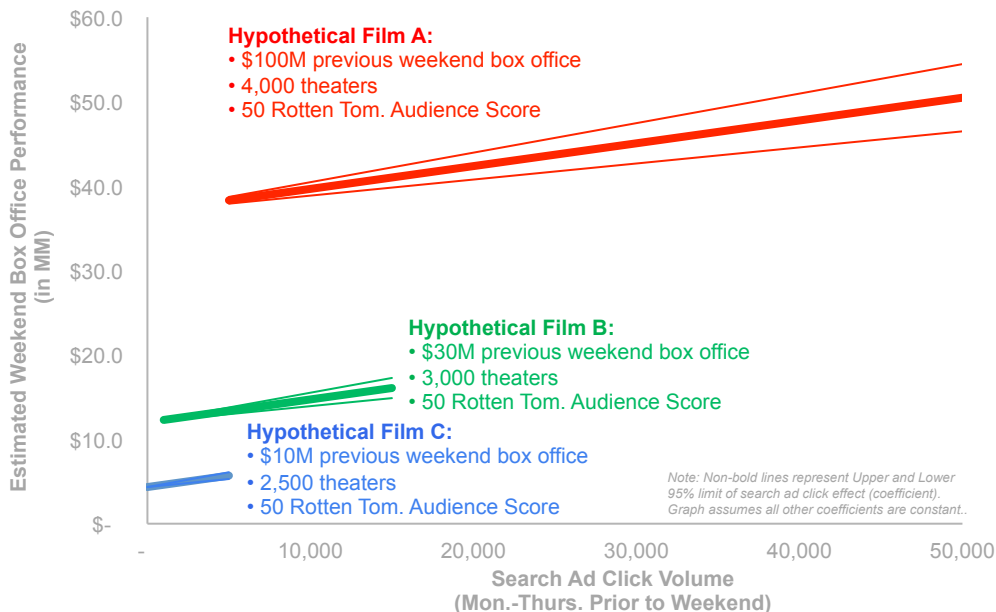- **search ad clicks (Monday-Thursday prior to weekend)**
- **theater count**
- **previous weekend performance**
- **Rotten Tomatoes audience score**[10]

If one film garners

10,000

more paid clicks than a similar holdover film, that film is likely to perform approximately $1.9-$3.5M better

Interestingly enough, search query volume for holdover films is not a significant factor in predicting box office performance after opening weekend, while search ad clicks remain a strong indicator. Our hypothesis is that once a film has opened, search ad clicks are a strong sign of intent to purchase a ticket, whereas the intent associated with a search query is more varied (i.e. undecided moviegoers searching for reviews, moviegoers who have seen the film looking for additional content, etc.).

The significance in our model of search ad click volume during weeks 2 and beyond for a film illustrates the importance of search marketing presence beyond opening weekend. According to our model, **if one film garners 10,000 more paid clicks than a similar holdover film, the film with more paid clicks is likely to perform approximately $1.9-$3.5M better** in weekend box office receipts than the other film (Figure 5).

Figure 5 | Holdover Weekend Prediction Model (Search Ad Click Volume as X-axis)

Hypothetical Film A:
- $100M previous weekend box office
- 4,000 theaters
- 50 Rotten Tom. Audience Score

Hypothetical Film B:
- $30M previous weekend box office
- 3,000 theaters
- 50 Rotten Tom. Audience Score

Hypothetical Film C:
- $10M previous weekend box office
- 2,500 theaters
- 50 Rotten Tom. Audience Score

Note: Non-bold lines represent Upper and Lower 95% limit of search ad click effect (coefficient). Graph assumes all other coefficients are constant..

Y-axis: Estimated Weekend Box Office Performance (in MM)
X-axis: Search Ad Click Volume (Mon.-Thurs. Prior to Weekend)

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[10] Peer rating on Rotten Tomatoes has more predictive capability than critic-based scoring systems on Rotten Tomatoes and others such as CineScore and MetaCritic, illustrating the power of "word-of-mouth" for holdover films.

IV. Predicting Box Office One-Month Before Release: In Trailer Searches We Trust

While an accurate opening weekend forecast calculated the day before premiere is certainly a valuable data point for planning post-release marketing strategy, it doesn't leave movie marketers with very much time to react and adjust their marketing campaigns in the pre-release time frame. What if movie marketers and studios could use search patterns to predict how their films were tracking weeks in advance? Fortunately, Google (and YouTube) search data gives a great indication of where a movie is headed as early as four weeks from release week.

Earlier we discussed the fact that title search query volume during the week of release is a strong indicator (R^2 = 70%) of how a film will perform in its first weekend. As one can imagine, the timing of certain categories of searches also matters. For example, we found that the quantity of ticket-related title searches (e.g. "iron man 3 tickets") is most predictive the week of release (R^2 = 85%), but loses its predictive power the further the film is from release date.

Similarly, overall title search volume[11] loses some of its predictive power the further it is from premiere date. As illustrated in Figure 6, the predictive power of overall search query volume decreases to 58% one week prior to release week (t-1); to 53% using data two weeks prior (t-2); and finally, to 50% using data three weeks prior (t-3). While these statistics show that overall title query volume provide some early indication of box office opening, we found that the key to forecasting box office receipts one month from release date lies in a film's trailer-related[12] search query volume.

Trailer Searches: A Key Leading Indicator

Trailers remain one of the most influential sources throughout the decision process to see a movie. In fact, we found that trailers are the most searched for category of information upon discovery of a new film.[13] Trailer searches, whether on Google or YouTube, signify strong intent -- searchers are actively seeking a sample of the film. Thus, it's no surprise that trailer-related search query volume holds strong predictive power. But when is this 'power' at its strongest?

In a recent survey,[14] we found that most moviegoers learn about a film four weeks in advance, often in conjunction with a major trailer drop or beginning of a major video ad campaign. When we looked at the category of trailer-related searches, we found that the number of trailer searches mattered most in terms of predicting box office in this same timeframe as well: four weeks prior to a film's release week (R^2 = 62%).

the key to long-range box office forecasting lies in movie trailer engagement

Pop(corn) Quiz: What can YouTube Search tell us about box office?
Searches on YouTube -- the world's #2 search engine -- also show a strong correlation to a film's opening weekend performance. A very telling pattern emerges when you look at YouTube searches during different periods of a film's marketing lifecycle. Similar to trailer-related Google searches, title-related searches on YouTube have the highest predictive power four weeks from release date (R^2 = 55%) -- even stronger than the predictive power of release week searches!

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[11] Bucket of title terms including: "[movie title]", "[movie title] film", and several modifiers related to ticketing, cast, reviews, trailers.
[12] Trailer-related searches include: "[movie title] trailer", "trailer for [movie title]", "[movie title] clip", and common misspellings.
[13] Google Consumer Survey. "The Moviegoer Research Process." Mar. 3, 2013.
[14] Google Consumer Survey. "The Moviegoer Research Process." Mar. 3, 2013.

Figure 6 | Predictive Power of Trailer-Related Search Volume and Overall Search Volume
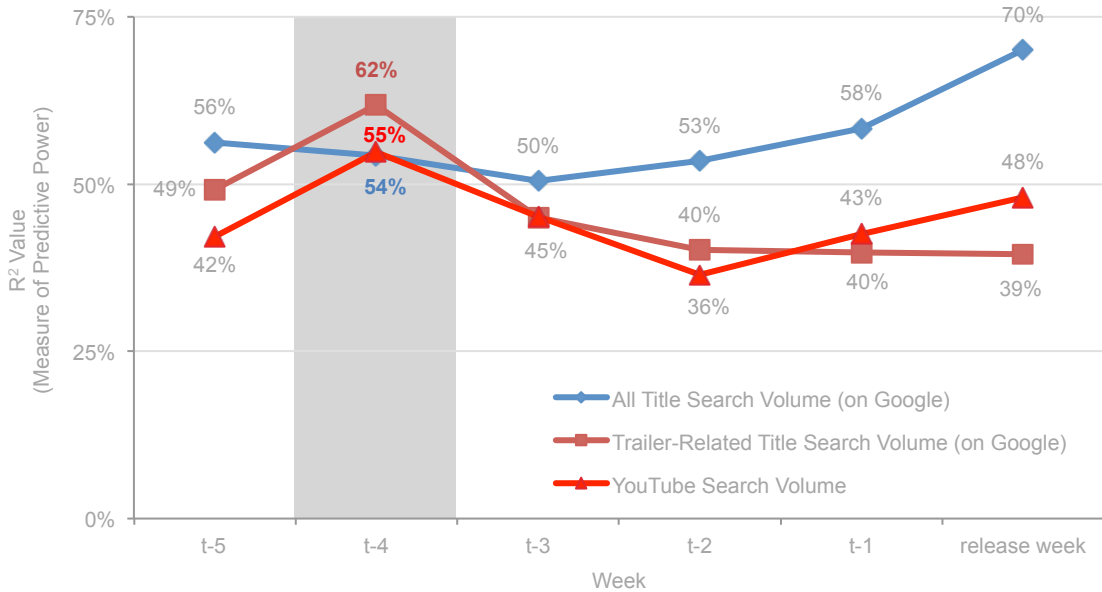
Furthermore, coupling a film's t-4 trailer-related search query volume with its franchise status[15] and seasonality[16] metrics yields a regression model predicting box office results with R^2 at a nearly perfect 94%!

So what does this mean for movie marketers? The availability of content, specifically trailers, is important for moviegoers at all stages of the decision process. Earlier searches four weeks from release week for a film have the strongest link to intent (as evidenced by the higher R^2 at t-4) despite a lower overall search volume,[17] presumably because the most ardent fans are among the first to search for specific film's content.

94%
of variation in a film's box office opening can be explained with trailer-related title search volume 4 weeks prior to release, coupled with seasonality and franchise status

Because 48% of moviegoers decide what film they want to watch the day of purchase decision,[18] this suggests that searchers in the three weeks leading up to premiere are still learning about various films, and it is crucial to have a continued search presence through opening weekend and beyond. As undecided moviegoers in this phase gather information, it is critical to provide content that can aid in the decision to see a particular movie.

V. Conclusion

The increase in digital engagement has given us fresh insight into how moviegoers are researching and engaging with various films. Though general query volume can give us an idea of what moviegoers are thinking about, we've taken this a step further by establishing the relationship between box office receipts and paid clicks. In addition, we found that the timing of trailer searches on both Google and YouTube are leading indicators of box office success. By understanding these search patterns, movie marketers are in a better position to align and adjust their strategies to capture the interest of potential moviegoers.

Whether it's general curiosity or full engagement with a film, moviegoers are constantly searching for information. Online engagement through search allows for the ability to interact with moviegoers in real time, giving them the chance to ask questions and receive immediate feedback. This presents an opportunity for an ongoing conversation with potential moviegoers, and more importantly for movie marketers, it presents a unique opportunity to guide this conversation through search marketing. Ultimately, it is this online engagement that gives us tangible insight into intent, arming movie marketers with actionable data in their never-ending quest to quantify 'movie magic.'
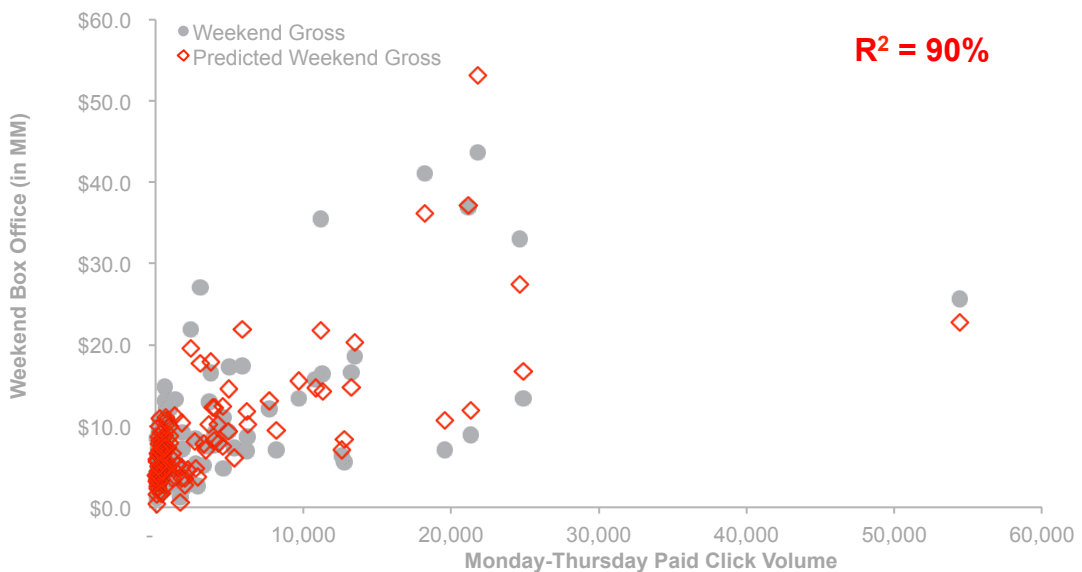
Appendix

Appendix A | Scatterplot of Multivariate Regression Model for 2012 New Films (Search Volume as X-axis)
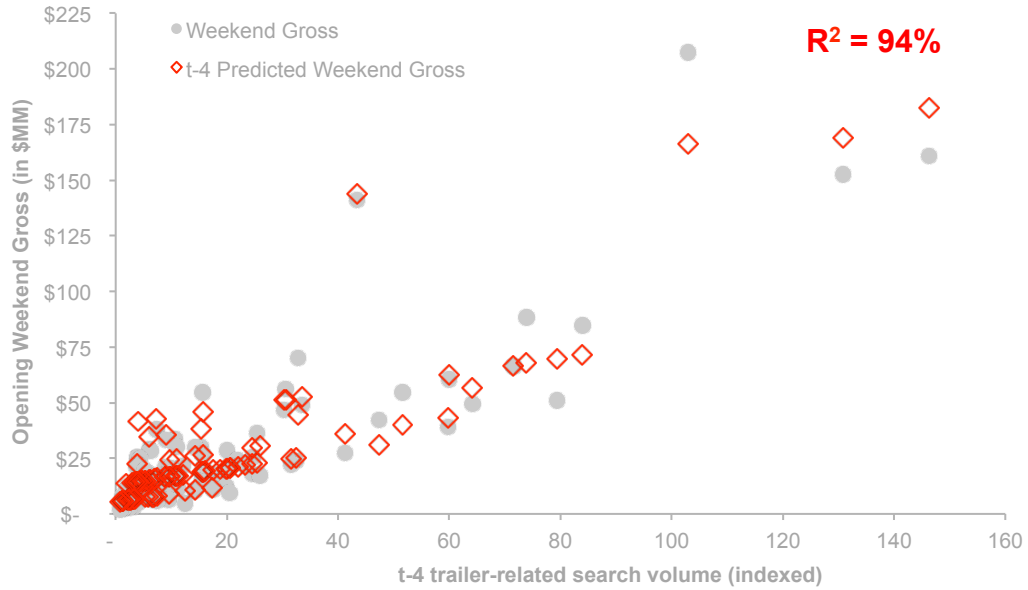

Appendix B | Scatterplot of Multivariate Regression Model for 2012 Holdover Films (Click Volume as X-axis)

Appendix

Appendix C | Scatterplot of Multivariate Regression Model for New Films (T-4 Trailer-Related Search Volume as X-axis)

Appendix D | Weekly Search Volume over Film Campaign (Average of 2012 films)