# Box Office Drivers of Motion Picture Sequels

Qianqian Wang

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# ABSTRACT

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Due to the high importance in the global economy and the availability of comprehensive data set, the motion picture industry has emerged as an important focus of research inquiry. A large amount of studies have been conducted to investigate the determinants of the box office revenues, and sequel is found to be a key factor in improving the box office performance of movies. In spite of the numerous studies concerning the motion picture industry, little is known about the specific box office drivers of motion picture sequels. Therefore, the purpose of this thesis is to (1) conceptualize movie sequels as brand extensions of an experiential product; (2) collect a data set comprising of both single movie sequels and multiple movie sequels to reveal box office drivers of movie sequels; (3) in terms of multiple movie sequels, how the box office performance of the most recent intervening sequels affects the box office revenue of the subsequent sequels and (4) what kind movie sequel is amenable to success.

A linear regression model approach is adopted to address this research topic. The results indicate that: (1) the box office performance of the parent movie is positively related to the success of the sequel; (2) the box office revenue of a movie sequel is influenced by its naming strategy; (3) PG-13 rated movie sequels are more amenable to success.

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## *I. Introduction*

The motion picture industry is considered one of the most appealing industry sectors in the global economy, both from the managerial and scholarship perspective. The gross box office revenue of all the movies has kept growing for the past five years. In 2009, the international box office reached $19.3 billion, while U.S./Canada box office reached $10.6 billion (MPAA 2009). Moreover, according to MPAA's 2010 Economic Contribution Report, the motion picture industry and the television industry supported 2.4 million jobs in U.S, contributing significantly to the economy.

Although the motion picture industry is relatively profitable, it is accompanied by high risks. Desai, Leob and Veblen (2002) summarized that the high up-front investment, uncertainty in consumers' reaction and forecasting difficulty all lead to the high risks in motion picture industry. Since 1980s, the production cost per film has increased steadily (Eliashberg et al., 2006). In line with the increased production cost, the level of risks also grows. Studios raise various strategies to cope with the risks, such as increasing the advertisement expenditure, including famous movie stars, releasing digital 3D screens and so on. Among all those strategies, producing movie sequels is favored, and it helps to reduce the risks and leverage the success of the parent movie (Basuroy & Chatterjee 2008). After the introduction of the first movie sequel in the motion picture history, From Russia with Love, which is the sequel of Dr. No, movie sequels have become popular. In 2009, 21 out of 671 released movies are movie sequels, including Transformers: Revenge of the Fallen, Ice Age: Dawn of the Dinosaurs and so on. Those 21 sequels brought in over $2 billion box office revenue in U.S./Canada market, making up about 20 percent of the 2009 gross U.S./Canada box office. However, there is no guarantee that every sequel

can make a success. A sequel can be the difference between millions of profits or loss. In the list of "Most Profitable Movies, Based on Absolute Profit on Worldwide Gross", Lord of the Ring: Return of the King ranked as high as the third place, with the profit of $ 472,513,663. By contrast, Evan Almighty, the sequel of Bruce Almighty, is the sixth biggest money loser in history, causing $88,390,360 loss to the studio (www.the-numbers.com). Therefore, it deserves research to look into the determinants of the box office revenues of movie sequels and provide insights that may help managers to reduce risks and make more profits.

Although not many distinctions between movie sequels and non-sequels have been identified, one major difference is obvious: non-sequels possess their unique story-lines and characters, while the story-line and characters, even the production style of sequels are associated with the parent movies. This prime difference leads us to expect that the mechanisms by which consumers evaluate sequels and non-sequels are different. Similar to non-sequels, movie sequels are also evaluated by the plot, star performance, spectacle, diction, releasing season and so on. In addition, consumers' evaluations of movie sequels also rely on their experience with the parent movies. So far, researchers have addressed topics about movie sequels from signaling and brand extension perspectives. Basuroy, Desai and Talukdar (2006) adopted the signaling and relevant behavior theory to reveal the role of sequels in improving the box office revenue. By exploring real world data, they examined sequels as an extrinsic cues which influence consumers' quality perception and empirically proved that sequels not only work as a good quality signal to increase the box office revenue but also interact with advertisements to positively affect the box office performance of motion pictures. Besides, other research involves the brand

extension theory into the study of movie sequels. Basuroy and Chatterjee's (2008) article plays a fatal role in this area. The authors regarded sequels as the brand extension of hedonic product and analyzed the characteristics of movie sequels. After collecting a random sample of 167 films released between 1991 and 1993, they applied regression to analyze their data. The results indicated that although the box office revenues of movie sequels fall behind the box office revenues of their corresponding parent movies, they perform better than their contemporaneous non-sequels. Furthermore, the authors pointed out that the shorter the time interval between the release of parent movies and the release of sequels, the better sequels perform. In addition, the number of intervening sequels released prior to the target sequel has a positive effect on the sequel's box office revenue. Finally, sequels are demonstrated to be more vulnerable to satiation compared with non-sequels. Sood and Dreze (2006) examined movie sequels as brand extensions of experiential goods and employed categorization models to evaluate movie sequels. Throughout laboratory experiments, the authors claimed that in terms of the extension of experiential goods, dissimilar extensions are rated higher than similar extensions. And they suggested that including a story line with a different genre from parent movies will lead to better box office performance. Hennig-Thurau, Houston and Heitjans (2009) also studied movie sequels as the brand extension of parent movies and introduced the modeling approach to capture the monetary value of brand extensions. In this study, it is found out that star continuity and rating continuity are positively related to the monetary value of movie sequels. Furthermore, star in-continuity even decreased sequels' overall revenue and the brand equity.

However, all the quantitative research in the field of motion picture sequels includes only the single sequels in their analysis to investigate the relationship between different factors and the success of the initial sequels, and none has been done to look into the success factors of multiple movie sequels. Therefore, for researchers, it is interesting to collect a comprehensive data set, with both the information of single sequels and multiple sequels, to study the box office drivers of motion picture sequels. Moreover, for multiple movie sequels, it is important to know that whether the performance of intervening sequels has an impact on consumers' attitude toward the subsequent sequels. Finally, the question of what kind movie is more suitable to have sequels is of great interests to studio managers.

Consequently, the major objective of this thesis is to: (1) collect a data set comprising of both single movie sequels and multiple movie sequels to reveal box office drivers of movie sequels; (2) in terms of multiple movie sequels, how the box office performance of the most recent intervening sequels affects the box office revenue of the subsequent sequels and (3) what kind movie sequel is amenable to success.

In this thesis, I adopt the perspective that movie sequels are brand extensions of experiential products and employ North American box office data set, including both single movie sequels and multiple movie sequels, to investigate the drivers of motion picture sequels. First, as the brand extension theory shows that consumers' experience with the parent brand will influence consumers' attitude towards the extensions (Battomley & Holden 2001; Van Riel et al., 2001; Lahiri & Gupta 2005), I examine how the performance of the parent movies affects the box office revenues of movie sequels. It

is a critical question to managers when they need to decide whether to produce a sequel for a certain movie.

Second, the fitness between the parent brand and the extensions is considered a crucial factor in improving the acceptability of the extensions (Aaker & Keller 1990; Volckner & Sattler 2006). Hennig-Thurau, Houston and Heitjans's (2009) study found that star continuity and rating continuity positively affect the brand extension value, while Sood and Dreze (2006) suggested that sequels with different genres from the parent movies are better evaluated. Therefore, this thesis aims at revealing how different aspects of fitness: star continuity, rating continuity, genre continuity and season continuity affect the box office revenue of movie sequels.

Third, as mentioned by Volckner and Sattler (2006), the characteristics of the extension are also an essential factor to the success of brand extension. Since sequels also fall in the movie category, I included the key characteristics of movies revealed in previous marketing literature in my analysis. The main characteristics are: budget, critical review, award, genre, MPAA rating and release month (Basuroy et al., 2003; Eliashberg et al., 2000; Sawhney & Eliashberg 1996).

Fourth, since the experience with the parent movie is stored in memory and memory decays over time (Basuroy and Chatterjee 2008), I would like to test whether the relationship between the parent movie performance and the box office revenue of sequels are moderated by the time interval.

Fifth, as studios release sequels, I investigate if the sequels' naming strategy matter, for example, the sequel of Iron Man is named Iron Man 2, adding a number after the name of the parent movie; the sequel of Underworld is named Underworld: Evolution,

adding a phrase to the name of the parent movie, while the sequel of Dogville is named using an unrelated name: Manderlay. Would studios prefer the related strategies, numbering and naming strategy, to achieve higher level of association with the parent movie, or rather use the unrelated names in order to reduce the possible satiation?

Finally, the past 20 years saw the prevalence of sequential brand extensions, in which a single parent brand is extended to more than one extension. In the motion picture industry, it is common that a movie spawns multiple sequels and become a franchise (Basuray & Chatterjee 2008). Under this circumstance, how the intervening sequels, particularly the most recent intervening sequel, affect the subsequent sequels is important to know.

The contribution of this thesis exists in several aspects. First of all, it is the only article which includes both single sequels and multiple sequels to study the box office drivers of motion picture sequels. Second, it is the first article to reveal how the intervening sequels affect the subsequent sequels from the sequential brand extension perspective. Finally, the relationship between different factors and box office revenues of movie sequels offers many managerial implications for studio managers.

The remainder of this thesis is organized as follows: in the next section, I review the related literature and developed testable hypotheses. Then, we describe the data collection process and conduct a quantitative analysis. Next, I present and interpret my results and discuss the theoretical and managerial implications. Finally, I close with a discussion of the limitation of this thesis and the potential future research of this topic.

## *II. Conceptual Background*

### *1. Brand Extension*

Brand extension is defined as using an established brand name, usually with a well-developed image, to launch a new product (Volckner & Sattler 2006; Aaker & Keller 1990). The last two decades have witnessed a proliferation of brand extension (Lahiri & Gupta 2005). Brand extension provides a way to reduce advertising expenditures (Aaker & Keller 1990; Kapferer 1992), increase the efficiency of promotional expense (Morein 1975), lower the new product introduction risk (Aaker & Keller, 1990) and leverage brand equity (Aaker 1991; Barwise 1993; Aaker & Keller 1990; Rangaswamy et al., 1993; Tauber 1988). The success of the brand extension depends on three categories of factors: (1) perceived quality of the parent brand; (2) fitness between the parent brand and the extension; and (3) brand extension characteristics.

(1) Perceived Quality of the Parent Brand

Zeithaml (1988:3) defined perceived quality as the "global assessment of the consumers' opinion about the superiority or excellence of a product". Aaker and Keller (1990) first studied the impact of the perceived quality of the parent brand on consumers' attitude towards the extension. In contrast to their hypothesis, no direct relationship between perceived quality of the parent brand and the attitude toward extensions is found. They further pointed out that only when the brand extension is a complement or substitute to the parent brand, higher perceived quality of the parent brand leads to more favorable attitude to extensions. Despite of the wide acceptance and diffusion of this study, various studies with even more comprehensive data set have been conducted and

generated contradictory results. Battomley and Holden (2001) collected a data set including data from Aaker and Keller's (1990) study and seven other replications all around the world. After undertaking a secondary analysis, they empirically proved a direct and positive relationship between perceived quality of the parent brand and evaluations of brand extensions. Since their data set included the data from different parts of the world, they even generalized their conclusion across culture. In spite of the distinctions between services and goods, higher quality perceptions toward the original brand are also associated with more favorable consumer evaluation of service brand extensions (Van Riel et al., 2001). In addition, perceived quality of the parent brand is demonstrated to be important to the evaluation of brand extensions, particularly in the case of services and consumer durables of high unit price (Lahiri & Gupta 2005).

In the motion picture industry, due to the high production cost and failure rate, studios make movie sequels as a way of risk reduction and to leverage the success of the parent movie (Basuroy & Chatterjee 2008). Since movies are characterized primarily by intangible characteristics and audience judge motion pictures in terms of their enjoyment value (Basuroy et al., 2006), they pertain to the experiential goods (Sood & Dreze 2006). Since products with intangible characteristics or providing consumers "experience" can take more advantage of brand extension strategy (Nelson 1974), the brand extension strategy in the motion picture industry arouses attention. In order to study the monetary values of the brand extension, Hennig-Thurau, Houston and Heitjans (2009) generalized brand extension theories into the case of motion pictures. Based on the investigated role of perceived quality of the parent brand in the brand extension, it is reasonable to predict that the perceived quality of the parent movie affects the possibility of acceptability of the

corresponding movie sequels. Since box office revenue is the easiest and most important criteria of measuring the success and perceived quality of a movie, my first hypothesis is: *H1: The box office revenues of parent movies have a significant and positive relationship with the box office revenues of movie sequels.*

(2) Fitness between Parent Brand and the Extension

To better understand the determinants of successful brand extensions, the effect of fitness between the parent brand and brand extensions also generated discussions. In the field of brand extension, fitness refers to the similarity between the parent brand and the extension (Arikan 2010). Aaker and Keller (1990) proposed three dimensions of fitness: complement, substitute and transfer. Complement refers to products which are consumed jointly to satisfy particular needs (Henderson & Quandt 1980). Substitute denotes that one product can replace the other one in product usage (Aaker & Keller 1990). Transfer measures whether the ability of a firm operating in the parent brand can be transferred effectively to brand extensions (Aaker & Keller 1990). Through their study, it is found that higher level of perceived transfer between the parent brand and extensions leads to higher evaluation and purchase likelihood of extensions. Replications of Aaker and Keller's (1990) study further confirmed the positive effect of similarity between the parent brand and extensions on the success of brand extensions. Moreover, fitness between the parent brand and an extension is even revealed to be the most crucial driver of brand extension success (Volckner & Sattler 2006). Lahiri and Gupta (2005) further pointed out that for consumer durables, non-durables as well as services, the greater the perceived similarity between the parent brand and extensions, the greater the possibility

of acceptance of extensions. Therefore, perceived fitness between the parent brand and extensions is positively associated with the brand extension success.

Sequels have been prevalent in the motion picture industry, but the up-front cost production of a sequel is usually higher than a non-sequel (King 2001). In most cases, after the release of the parent movie, actors and actresses become popular and strongly associated with the characters, so they charge much higher salary for performing in a sequel (Basuroy et al., 2006). Therefore, involving the same actors and actresses in a sequel is a credible signal that the sequel is of such a high quality that it can recover the additional up-front product cost (Basuroy et al., 2006). Furthermore, Hennig-Thurau, Houston and Heitjans's (2009) study empirically investigated movie sequels as brand extensions and examined the effect of fitness between the parent movie and movie sequels on the monetary value of brand extensions. To capture the consistency between the parent movie and sequels, 11 fitness variables on key facets such as stars, rating, genre, are included in this study. After the forward-spillover-effect regression, it is found that star continuity and rating continuity positively affect the monetary value of movie sequels. Moreover, to explain the critical importance of star continuity in the success of brand extension, Hennig-Thurau, Houston and Heitjans's (2009) study took Spider-Man as an example. They indicated that all else being equal, but replacing Tobey Maguire with an actor of identical star power and salary, the sequel's revenue would have been decreased by $181.8 million. And the star in-continuity would even result in a negative brand extension value of -$129.1 million. This study implies that star continuity and rating continuity are essential to both the box office revenue of movie sequels and brand equity of the parent movie. Therefore, I propose that:

*H2a: Star continuity is positively related to the box office revenue of movie sequels.*

*H2b: Rating continuity significantly and positively affects the box office revenue of movie sequels.*

It is widely known that movies are vulnerable to seasonality. There are three releasing peaks in motion picture industry. The highest peak is the Christmas time. The second one is the summer time between June and August. And the final peak is the time around Easter (Litman 1983). For studios, it is important to question that what the best releasing time for movie sequels is. Should the managers pick the peak periods to release sequels or should they try to release the sequels in the same month as the parent movie? From the traditional brand extension perspective, continuity is favored over in-continuity. Therefore, I propose that:

*H2c: Season continuity has a positive and significant effect on the box office revenues of movie sequels.*

Although numerous studies have revealed the critical role of fitness in the brand extension, by examining movie sequels as the brand extension of experiential goods and conducting laboratory experiments, Sood and Dreze (2006) proposed that genre continuity is not good for the box office performance of the sequels. And it is suggested that sequels should introduce a new story line which include a different genre from the parent movie rather than keep the same genre as the parent movie to get better evaluation from the audience. Therefore, I hypothesize that:

*H2d: Genre continuity has a negative relationship with the box office performance of the sequels.*

(3) Characteristics of the Extension

As mentioned in the theory of brand extension, the characteristics of the extension are also of great importance to the success of brand extension. Therefore, taking movie sequels as the extension of parent movies, the characteristics of sequels are highly correlated with the success of sequels. Since movie sequels still belong to the movie category, they possess the common characteristics as other movies. So far, various studies have been conducted to find out the main characteristics of movies, which may affect their box office performance (Basuroy et al., 2003; Ravid 1999). And I summarize them as follows:

**Budget**

Budget refers to the monetary investment on a certain movie, which is used to cover the salary of castings, costume spending, post-production expenditure and so on. So far, numerous studies have demonstrated the significant role of production budget in the motion picture industry. Studies show that although higher production budget are not always correlated with higher return on investment, it significantly affects the box office revenue of movies (Ravid 1999). Moreover, Litman (1983) took high production budget as a high quality and popularity signal. Furthermore, some other studies found the positive relationship between the production budget and the box office revenues (Prag & Casavantt 1994; Basuroy et al. 2003). For movie sequels, since the actors and actresses may charge higher salary, more money may be needed to adding special effects in order to surpass the parent movie, budget becomes even more important.

**MPAA Rating**

Motion Picture Association of America rates movies according their content suitability to certain audience. So far, based on the contents of violence, nudity, sex and

some other matters, movies are classified into five MPAA ratings: G, PG, PG-13, R and NC-17. G-rated movies are considered suitable for general audience and people of all ages are admitted. PG means parental guidance suggested. For PG-rated movies, parents are suggested to watch the movies before they make the decision of permitting their children to watch or not. PG-13 includes movies that contain materials which are unsuitable to children under thirteen years old. And parents need to be strongly cautioned. R-rated movies may include violent or sexual scenes, hard language, drug abuse and some other materials which are not suitable for children under 17 years old. Therefore, children less than 17 years old are not allowed to attend R-rated movies without accompanies of a parent or adult guardian. NC-17 is included in MPAA rating recently and it refers to movies that are definitely not appropriate for children. Therefore, children less than17 years old are strictly restricted from attending NC-17 rated movies. Basuroy and Chatterjee (2008) empirically demonstrated that MPAA ratings are correlated with the box office revenue of movies. And movies rated R and PG_13 are not found to perform better than other ratings in the box office revenue (Sawhney & Eliashberg 1996).

**Movie Genre**

Genre is another important characteristic of movies. Depending on the story line, settings, mood, theme and some other factors, movies are categorized into 9 main genres: comedy, adventure, drama, action, suspense, horror, romantic comedy, documentary and musical (www.the-numbers.com). Some genres are welcomed by the majority, such as action, adventure, comedy and romantic comedy, while some others are more favored by a smaller group of people, for example, the music and drama movie. Previous studies

have found that comedy has a significant effect on the box office revenue of movies (Sachay 1994), while drama is negatively related with theatrical performance (Prag & Casavant 1994).

**Critical Review**

Critical review strongly affects consumers' purchase decision (Eliashberg & Shugan 1997), particularly for experience goods (Neelameghan & Jain 1995). It is considered as the dominant factor in the motion picture industry (Eliashberg & Shugan 1997). It is found that people in U.S rely heavily on critical reviews when choosing movies (The Wall Street Journal 2001).Critical review not only influences the box office performance of movies, but also acts as the predictor in motion picture industry (Basuroy et al., 2003). The motion picture industry can use various movie characteristics, such as critical review to forecast the possible box office performance (Sawhney & Eliashberg 1996).

**Awards and Nominations**

Being nominated or awarded is of great importance to the box office performance of movies from two ways. First, since experts and professional critics are involved in the evaluation process of movies, awards and nominations are taken as a credible signal of good quality. Second, the release of the awards and nominations results makes the movies awarded or nominated more well-known by the public. It may evoke people's interests of watching the movie. Previous studies have found that awards and nominations are positively related to the box office revenue of movies (Prag & Casavant 1994).

**Release Quarter**

Litman (1983) pointed that there are three peak periods of audience attendance in motion picture industry: Christmas time, summer time and Easter time. Movies are very seasonal. Moreover, it is found that the average box office revenue of movies is higher in the peak time than in the low time. Since movies are regarded as a single-purchase product and their sales decrease over time, previous studies suggested movie should be launched immediately or wait until the high season (Radas & Shugan 1998). Studies even found that movies released during peak periods performed significantly better than those released in low season (Litman 1983; Sachay 1994; Krider & Weinberg 1998).

*2. Sequel Timing*

Consumer purchase decision making process interests both managers and marketing researchers. Lynch and Srull's (1982) article plays a seminal role in applying cognitive process theory to consumer purchase decision making process. In this article, they proposed that consumers' judgments towards a certain product are either memory-based or stimulus-based. If all the information concerning the product is directly present when a judgment is made (e.g. buying from a mail-catalogue), such a judgment is considered "stimulus-based". However, if a judgment making relies on information which is not directly present, such as prior experience with a product, other people's evaluation and so on, such a judgment is "memory-based". In the daily life, pure stimulus-based judgment is rare, while most of the judgments are either memory-based or mixed (Lynch & Srull 1982). In the case of motion picture industry, when consumers need to make a purchase decision toward a certain movie sequel, they are presented with some direct information (cast list, ticket price and etc), but they rely primarily on indirect information, such as the experience with the parent movie, critical reviews and so on. Therefore, I believe that

consumers' decision making towards motion picture sequels is mixed, but primarily memory-based. Since the memory decays over time and the association with the parent movie trails off as the time passes (Basuroy & Chatterjee 2008), it is predicted that the impact of the parent movie performance on consumers' attitude towards the motion picture sequels will be less and less strong as the time passes. The smaller the time interval between the parent movie and the movie sequel, the stronger the parent movie impacts consumers' attitudes towards the motion picture sequel. Therefore, my third hypothesis is:

*H3: The longer the time interval between the release of the parent movie and the sequel, the weaker the box office revenue of the parent movie affects the box office revenue of the sequel.*

*3. Naming Strategy*

How to name the extensions is essential to the success of brand extension. To both achieve a high associations with the parent brand and avoid the possible satiation, two general naming strategies have been adopted in brand extensions (Farquhar et al. 1992). One strategy is direct naming strategy, in which the extension uses exactly the same brand name as the parent brand. For example, Sony is used as the brand name for so many products, such as television, laptop, MP3 and so on. While the other strategy is brand-bridging strategy, in which the extension use the parent brand name in an indirect way, such as "Lycra by Dupont" (Vanhonacker 2007).

In terms of motion picture sequels, a critical decision directors need to make is how to name the sequel. The actual practice seems to be mixed. Generally, two kinds of related naming strategy are widely used. One is the numbering strategy, adding a number to the

parent movie name to signify the new movie as a sequel (e.g. Shrek 2), the other one is the naming strategy, adding a phrase instead of a number to the name of the parent movie as a sequel signal (e.g. Underworld: Evolution) (Sood & Dreze 2006). However, to bring more feelings of freshness into the sequels, some directors decide to assign a new name, unrelated to the parent movie, to the sequels. For example, the sequel of the film Dogville is named Manderlay. Based on the research results about how the associations between the parent brand and the extensions contributes to the success of the brand extensions, it makes sense that studios should make the associations between the parent movie and the sequels as salient as possible (Basuroy & Chatterjee 2008). Therefore, it is likely that compared with assigning an unrelated name to the sequels, the related naming strategy, which reminds consumers of the parent movie and offers extrinsic cues to associate the sequels with the parent movie, will lead to more favorable attitudes towards the movie sequels. Accordingly, my fourth hypothesis is:

*H4: The related naming strategy positively affects the box office revenue of the motion picture sequel.*

*4. Sequential Brand Extension*

Nowadays, brand extension has been one of the most popular strategies. Most of past research has focused on the single brand extension associated with a unique parent brand (Swaminathan 2003). However, a single brand name is often utilized to launch a series of products. For example, Virgin Group, which was initially a record label, has extended its brand into many different industry sectors, such as transportation (Virgin Atlantic Airways, Virgin America and etc.), electronics (Virgin Mobile USA, Virgin Radio and etc.), game stores and video stores (Virgin Megastores) and so on. Therefore, it is

necessary to study the sequential brand extension, which refers to that a unique brand name is sequentially extended to more than one product.

So far, two articles have addressed the topic of sequential brand extensions. Keller and Aaker's (1992) study analyzed how consumers evaluated a proposed extension of a parent brand which has been extended to other products. It is found that intervening extensions affects both the evaluation of a subsequent extension and the attitude towards the parent brand. For an average quality parent brand, a successful intervening extension will generate favorable attitude towards the subsequent extension, while for high quality parent brand, an unsuccessful intervening brand will decrease consumers' evaluation of the subsequent extension. In terms of the effect of intervening extensions on the perception of the parent brand, it is revealed that a successful intervening extension will increase consumers' evaluation of the average-quality parent brand, while an unsuccessful intervening extension will not harm consumers' perception of the parent brand. Swaminathan's (2003) research also plays a crucial role in the field of sequential brand extensions. In this study, the reciprocal effect of sequential brand extensions and consumer brand choice behavior is examined. He pointed that consumers' experience with the parent brand as well as with intervening extensions affects consumers' purchase behavior of a subsequent brand extension. Moreover, it is found that for consumers who have a low loyalty towards the parent brand, the performance of intervening extensions affects the evaluation of the subsequent extension even more strongly. And when consumers have more than one experience with intervening extensions, they will be more likely to try the subsequent extension.

In terms of the motion picture industry, it is common that a film spawns multiple sequels and become a franchise (Basuray & Chatterjee 2008). So I can apply the theory of sequential brand extensions to examine the motion picture franchises. According to the revealed positive relationship between the performance of intervening extensions and the evaluation of the subsequent extension, it is reasonable to predict that box office revenues of intervening sequels will positively affect the box office revenue of the subsequent sequel. Furthermore, since the time interval decays consumers' memory of intervening movie sequels, and consumers' judgments rely more on the most recent knowledge about the prior experience, it is believed that the performance of the most recent intervening movie sequel will affect the performance of the subsequent sequel more strongly than other intervening sequels. Therefore, this thesis will focus primarily on how the performance of the most recent intervening sequels affects the box office revenue of the subsequent movie sequel and I hypothesize that:

*H5: The box office revenue of the most recent intervening sequel is positively and significantly related to the box office revenue of the subsequent movie sequel.*

Table 1 summarized the proposed hypotheses and their underlying theoretical backgrounds.

## *III. Methodology*

### *1. Data*

Since the purpose of this thesis is to reveal the box office drivers of motion picture sequels, a sample of movie sequels, including both single sequels and multiple sequels are required. Single movie sequels refer to sequels which are the only sequel of parent movies, while multiple sequels refer to sequels whose parent movies have more than one sequel. Moreover, from the data analysis perspective, some other criteria needs to be satisfied: (a) information concerning movie characteristics, such as movie genre, MPAA rating and so on, are available, (b) were released in United States and the U.S. box office statistics are accessible, and (c) both the movie characteristic information and U.S. box office revenue of parent movies are applicable. According to the dataset in www.the-numbers.com, between 1964 and 2008, 556 movie sequels were released. However, since the PG-13 was officially included in MPAA rating in July 1984, 80 out of 556 movie sequels released before 1985 were deleted. Furthermore, the other 73 movie sequels were dropped from the sample as their U.S. box office statistics are not available. Finally, to satisfy criteria (c), 259 sequels without comprehensive information of their corresponding parent movies were dropped. Therefore, my final sample consists of 143 movie sequels and among those, 72 items are single sequels, while the rest 71 items are multiple sequels (see Appendix A for a listing of movie sequels included in the analysis and Table 2 for the relevant statistics of the sample data).

In the sample, the proportion of multiple sequels is consistent with the actual proportion of multiple sequels in recent years. For instance, an overview of sequels released these years by www.the-numbers.com shows that 12 out of 29 sequels released

in 2008 are multiple sequels and 44.4% sequels belong to multiple sequels in 2009.Therefore, the sample is representative of the reality in motion picture industry. Moreover, the histogram of the dependent variable (REVENUE) is presented in Figure 1. It is found that it is positively skewed, but sequels of high and low box office revenues are all included.

*2. Measures and Data Description*

REVENUE is the dependent variable in my study to capture the domestic box office revenue of each movie sequel. Since movie sequels still fall in the movie category and characteristics of sequels are also important for the success of the brand extension, box office drivers of movies revealed in previous studies, such as movie genre, MPAA rating, releasing time, awards, critical review and budget, are included in my study. Furthermore, based on the proposed hypotheses, the domestic box office revenue of parent movies and the most recent intervening sequels, time interval between the release of parent movies and sequels, fitness variable (star continuity, rating continuity, genre continuity and season continuity), naming strategy and the interaction term between the box office revenue of the parent movie and the time interval are also included as the independent variables.

The following part presents the detailed explanation of all the variables and Appendix B makes a summary of variables.

**Dependent Variable**

The domestic box office revenue of each movie sequel (REVENUE) is created as the dependent variable. The majority of the data is obtained from www.the-numbers.com, while www.boxofficemojo.com is used as the complementary source.

**Control Variables**

(1) Given that the production budget plays a significant and positive role in the box office performance of movies, the production budget (BUDGET) is included as a control variable and measured in million dollars in my study. www.the-numbers.com and www.boxofficemojo.com provided the budget of each movie.

(2) Award and Nomination

Although various organizations award good performance movies every year, the Academy of Motion Picture Arts and Sciences is the one of the highest reputation and widest influence. Since previous studies have pointed out that winning or being nominated by the Academy of Mention Picture Arts and Sciences acts as a credible signal of good quality and positively affects the box office performance (Litman 1983, Prag & Casavant 1994; Basuroy et al. 2003), AWARD is included as a dummy variable in my study to capture the potential effect of awards and nominations. AWARD take the value of 1 for movies who have won or been nominated for at least one Oscar and 0 otherwise. And the information concerning Oscar winning and nomination records is obtained from www.boxofficemojo.com.

(3) MPAA Rating

In my sample, movies of four categories are included: P, PG, PG-13 and R. So I create dummy variables: M_P, M_PG, and M_PG_13 for P, PG and PG-13 with R as the default. For example, if a movie is rated as PG, M_PG for this movie would get the value of 1, while M_P and M_PG_13 takes the value of 0. The MPAA rating of each movie is obtained from www.the-numbers.com and www.boxofficemojo.com.

(4) Movie Genre

www.the-numbers.com classified movies into 9 main genres: comedy, adventure, drama, action, suspense, horror, romantic comedy, documentary and musical. Among those, the beginning 6 genres make up 90.81% of all the movies released. My sample contains movies of 6 main genres: action, adventure, comedy, drama, horror and suspense. Therefore, 5 dummy variables: G_ACT, G_ADV, G_COM, G_DRAM, G_HORR are created, with suspense as the default.

(5) Critical Review

Given that the critical review has a significant effect on the box office revenue of movies, I collected the critical review of each movie from www.rottentomatos.com. www.rottentomatos.com provides the number of reviews counted and average rating in the following three classifications respectively: T-Meter Critics, Top Critics and Rotten Tomato Community Critics. To better collect the overall critical review for each movie, I calculated the weighted average value of the above three critical reviews as the average critical review of each movie.

(6) Release Quarter

It is known that the box office revenue of each movie is sensitive to seasonality. Some movies were released during the three peak periods as mentioned by Litman (1983): Christmas time, summer time and Easter time to attract more attention, while some others were released at other time to avoid the high competition among the peak periods. To account for the release quarter of each movie, I created 3 dummy variables: Quar1, Quar2 and Quar3, with the fourth quarter as the default. These dummy variables take the value of 1 if the movie is released in that quarter, and 0 otherwise. The

information concerning the release month of each movie is obtained from www.the-numbers.com.

**Variables about Sequels**

(1) Domestic box office revenues of parent movies (REVPARENT) are taken as a measure of the perceived value of parent movies, in million dollars. In the brand extension theory, better perceived value of parent brand leads to more favorable evaluation towards the extensions. So it is believed that higher box office revenues of parent movies lead to better box office performance of sequels. And information about domestic box office revenues of parent movies is obtained from www.the-numbers.com and www.boxofficemojo.com.

(2) INTERVAL represents the time interval between the release of parent movies and sequels. I obtain the release date of parent movies and sequel from www.the-numbers.com and calculate the time interval by days.

(3) Star continuity (SC) denotes the percentage of main actors and actresses of the parent movie who also participate in the sequel. This way of measuring season continuity is coherent with Hennig-Thurau, Houston and Heitjans (2009). For each movie, we take at least one and at most three actors and actress as the main actors and actresses. And the lists of main actors and actresses are obtained from www.boxofficemojo.com and www.imdb.com. For example, the main actors of Mission Impossible are Tom Cruise, Jon Voight and Emmanuelle Beart, while the main actors of Mission Impossible 2 are Tom Cruise, Dougray Scott and Thandie Newton. Therefore, 1 out

of 3 main actors of the parent movie appeared in the sequel. And the SC variable of Mission Impossible 2 takes the value of 33%.

(4) Genre continuity (GC) is a dummy variable, which takes the value of 1 if parent genre and sequel genre are equal and 0 if otherwise. And the way of measuring genre continuity is according to Hennig-Thurau, Houston and Heitjans (2009). www.the-numbers.com provided genre of each movie and their parent movie.

(5) Rating continuity (RC) is a dummy variable. If the MPAA rating of the sequel is the same as the parent movie, RC takes the value 1 and 0 otherwise. And the way of measuring rating continuity is consistent with Hennig-Thurau, Houston and Heitjans's (2009) study. The MPAA ratings of sequels and their parent movies are available in www.the-numbers.com and www.boxofficemojo.com.

(6) I created a measure of season continuity, SEC, assigning a number from 0 to 6 to each movie based the difference in month between month of release of parent movie and sequel. And the way of measuring season continuity is consistent with Hennig-Thurau, Houston and Heitjans's (2009) study. Data about the release month of parent movies as well as sequels is obtained from www.the-numbers.com.

(7) REVINTERVENING refers to the domestic box office revenue of the most recent intervening sequel. It is created to measure how the most recent intervening brand extension will affect the subsequent extension. For single sequels, there is no intervening sequel. So the REVINTERVENING gets the value NA. While for multiple sequels, I collect the box office revenue of the most recent intervening sequels from www.the-numbers.com and www.boxofficemojo.com .

(8) SEQUEL is also a dummy variable, which takes the value of 1 for multiple sequels and 0 for single sequels. It is obtained from www.the-numbers.com.

(9) NAMING

By reviewing the names of sequels, it is found that generally, sequels use two naming strategies: related naming strategy and unrelated naming strategy. In terms of related naming strategy, the sequel is named by adding a number or a phrase after the name of the parent movie. However, unrelated naming strategy refers to that the sequel is named using a new name which is completely unrelated to the name of the parent movie. I created the dummy variable NAMING to capture the impact of naming strategy on the box office revenue. NAMING gets a value of 1 if the sequel is named using the related naming strategy and 0 otherwise. The name of each movie is obtained from www.the-numbers.com.

(10) Interaction Term: REVPARENT*INTERVAL

Since I would like to test the moderating role of time interval in the relationship between the box office revenue of the parent movie and the sequel, both the time interval and the interaction term of time interval and the box office revenue of the parent movie should be included. As mentioned above, INTERVAL is included as an independent variable in my analysis. So I created the interaction term: REVPARENT*INTERVAL to capture the interaction of time interval and box office revenue of the parent movie.

## *IV. Analysis*

### *1. Modeling Approach*

In order to reveal the relationships among different factors and revenues in the motion picture industry, the linear regression model approach is employed. First, I build a regression model based on the previous research and the hypotheses I would like to test in my thesis. Second, since I would like to use the Ordinary Least Square (OLS) method to get the BLUE (best linear unbiased estimation) of my linear model, I test whether the assumptions of OLS are satisfied. However, in the process of assumption tests, I found that the linear regression model I assumed cannot satisfy all the assumption. Therefore, I conduct a box-cox transformation of the dependent variable (REVENUE). Then, I get a transformed linear model and estimate it by the OLS method.

In order to reveal the box office drivers of movie sequels, the following linear regression model is assumed, based on previous studies and the hypotheses I would like to test:

$$
\begin{aligned}
REVENUE = {} & \beta_0 + \beta_1 * REVPARENT + \beta_2 * SC + \beta_3 * RC + \beta_4 * GC + \beta_5 * SEC \\
& + \beta_6 * REVPARENT * INTERVAL + \beta_7 * INTERVAL + \beta_8 * NAMING \\
& + \beta_9 * SEQUEL * REVINTERVENING + \beta_{10} * BUDGET + \beta_{11} * AWARD + \beta_{12} * G\_ACT \\
& + \beta_{13} * G\_ADV + \beta_{14} * G\_COM + \beta_{15} * G\_HORR + \beta_{16} * G\_DRAM + \beta_{17} * QUAR1 \\
& + \beta_{18} * QUAR2 + \beta_{19} * QUAR3 + \beta_{20} * M\_G + \beta_{21} * M\_PG + \beta_{22} * M\_PG\_13 \\
& + \beta_{23} * CRR
\end{aligned}
$$

Where REVENUE is the domestic box office revenue of movie sequels, $\beta_0$ the intercept; REVPARENT is the domestic box office revenue of parent movies; SC denotes the star continuity of the sequel, which measures the percentage of actors and actress of the parent movie who are involved in the sequel; RC refers to the rating continuity of the

sequel, which takes the value of 1 if the parent movie and the sequel is of the same MPAA rating and 0 otherwise; GC represents the genre continuity of the sequel, which gets a value of 1 if parent movie and sequel genre is equal and 0 if otherwise; SEC measures the difference in month between month of release of parent movie and sequel, which takes the value from 0 to 6; REVPARENT*INTERVAL is the interaction of REVPARENT and INTERVAL; INTERVAL is the time interval between the release of the parent movie and the sequel, in days; NAMING is a dummy variable, which gets a value of 1 for movies using related naming strategy and 0 otherwise; SEQUEL*REVINTERVENING is the interaction term between REVINTERVENING and SEQUEL; BUDGET measures the production budget of each movie, in $ million; AWARD is a dummy variable, which take the value of 1 if the movie has been nominated or won Oscar, 0 otherwise; G_ACT, G_ADV, G_COM, G_HORR, G_DRAM are dummy variables, representing the following movie genres: action, adventure, comedy, horror and drama; Quar1, Quar2 and Quar3 are dummy variables, showing the release quarter of the sequel; M_G, M_PG, M_PG_13 are dummy variables, representing the G-rated, PG rated and PG_13 rated movies respectively; CRR is the critical review of each movie.

As mentioned above, I would like to use the Ordinary Least Square method to get the BLUE estimation the coefficients in my regression model. Therefore, I first need to test the assumptions of OLS: (1) linearity; (2) $E(\varepsilon_i) = 0$; (3) homoscedasticity; (4) no serial correlation; (5) Normality; (6) no perfect multi-collinearity. Linearity refers to that the model is linear in coefficients, correctly specified and has an additive error term. To test the linearity, the Ramsey RESET test is employed. The null hypothesis of Ramsey

RESET test assumes that the model is linear and correctly specified. By specifying the number of fitted terms as 1, I get the RESET test result (See Table 3). From the result I can see that the p-value=0.026, which is smaller than the required significance level (0.05). Therefore, I can reject the null hypothesis of linearity and conclude that my model is not correctly specified. So the linearity assumption is violated. From the histogram of residuals in Figure 2, I can find that the expected value of error term is 2.73e-08, approximately equal to zero. So assumption (2) is satisfied. Homoscedasticiy assumes that the variance of the error terms is constant. One way to detect heteroskedasticity is to use the Breush-Pagan-Godfrey test. The result of Breush-Pagan-Godfrey test (presented in Table 4) shows that the p-value= 0.0199, which is smaller than the significance level (0.05). So there exists heteroskedasticity and the homoskedasticiy assumption is violated. No serial correlation, which requires that all disturbance terms are independently distributed, is tested by Durbin-Watson test. The calculated Dubin-Watson statistic of this model is 1.92, complying with the no serial correlation assumption. Normality, which means the error term has a normal distribution, is tested by the Jarque-Bera test. The p-value of Jarque-Bera test is approximately 0 (See Figure 2), smaller than the required significance level. So the normality assumption should be rejected. Perfect multi-colilinearity, which means that one or more independent variables are a perfect linear function of any others, is tested by the correlation matrix (See Table 5). From the correlation matrix, I can see that there is no perfect multi-collinearity among independent variables. Above all, the assumed regression model violated linearity and normality assumption. Therefore, in order to use the OLS estimation, the model must be transformed.

*2. The Box-Cox Transformation*

Since the function form of the dependent variable plays an important role, a formal test: the box-cox transformation is used to choose the best functional form of my dependent variable REVENUE.

Box-Cox transformation was first raised by Box and Cox (1964) paper. It is also known as power transformation. At present, Box-Cox transformation is widely used to generate the linear model. For dependent Y>0, box-cox transformation follows the formula:

$$Y(\lambda)=\begin{cases}(Y^{\lambda}-1)/\lambda & if\ \lambda\neq 0\\ \log y & if\ \lambda=0\end{cases}$$

Therefore, to find out the appropriated $\lambda$, the box-cox transformation is conducted in SAS. The result (See Table 6) shows that $\lambda$=0.5 is both the best and most convenient at this point. Therefore, I transform the dependent variable (REVENUE) with $\lambda$=0.5. According to the Box-Cox transformation formula mentioned above, the transformed dependent variable is:

$REVENUE\_TR=(REVENUE^{0.5}-1)/0.5$

Thus, the regression model is transformed to the following one:

*Transformed Model*

$$\begin{aligned}REVENUE\_TR &= \beta_0+\beta_1*REVPARENT+\beta_2*SC+\beta_3*RC+\beta_4*GC\\ &+\beta_5*SEC+\beta_6*REVPARENT*INTERVAL+\beta_7*INTERVAL\\ &+\beta_8*NAMING+\beta_9*SEQUEL*REVINTERVENING+\beta_{10}*BUDGET\\ &+\beta_{11}*AWARD+\beta_{12}*G\_ACT+\beta_{13}*G\_ADV+\beta_{14}*G\_COM\\ &+\beta_{15}*HORR+\beta_{16}*G\_DRAM+\beta_{17}*QUAR1+\beta_{18}*QUAR2+\beta_{19}*QUAR3\\ &+\beta_{20}*M\_G+\beta_{21}*M\_PG+\beta_{22}*M\_PG\_13+\beta_{23}*CRR\end{aligned}$$

*3. OLS Analysis of Transformed Regression Model*

Before the OLS analysis of the transformed regression model, I also need to test all the six assumptions: (1) linearity; (2) $E(\varepsilon_i) = 0$; (3) homoscedasticity; (4) no serial correlation; (5) Normality; (6) no perfect multi-collinearity. The linearity assumption is tested by the Ramsey RESET test. Same as the original regression model, I set the number of fitted terms as 1. In the result (Table 7), the p-value is 0.1082> 0.5 (significance level). So I cannot reject the hypothesis that the model is linear and correctly specified. Then from the histogram of the residual in the transformed regression model in Figure 4, I can see that the expected value of the error term is approximately zero. To detect whether there exists the heteroskedasticity in the transformed model, the Breusch-Pagan-Godfrey test is used. The result (See Table 8) shows a p-value=0.23, which is higher than the significance level. So there is no evidence of heteroskedasticity. The Durbin-Watson statistics calculated for this model is 1.78. Thus, there is no serial correlation detected in this model. The normality assumption is tested by the Jarque-Bera test. In the histogram of residuals in transformed regression model (Figure 4), the p-value of Jarque-Bera test is 0.84, which is higher than the significance level. Therefore, the normality assumption is satisfied. Since the independent variables are same in the original model and transformed model, assumption (6) is satisfied as tested before.

Based on the assumption tests, it is found that the transformed model satisfies all the assumptions of ordinary least square. Therefore, the Ordinary Least Square Estimation is conducted to estimate the coefficients in the transformed model.

## *V. Results and Discussions*

Table 9 reports the estimation result for the transformed regression model. I perform the estimations using EVIEWS.

First of all, the adjusted R-square of the regression model is equal to 0.779, showing that 77.9% variance in the dependent variable (REVENUE) can be explained by the independent variables included in this model. Therefore, I consider the explanation power of the regression model is strong. In addition, the F-statistic of the model is 18.5 and its corresponding probability is 0.00, demonstrating that the regression model fits the sample well.

Secondly, among the variables related to my hypotheses, the variable REVPARENT (the box office revenue of the parent movie) has a marginally significant and positive coefficient (β=8.97e-06, p-value=0.0596), supporting H1 (the box office revenue of the parent movie has a significant and positive effect on the box office revenue of the sequel). This finding is consistent with the brand extension theory: better the perceived quality of the parent movie leads to more favorable attitudes towards the brand extension. The variable NAMING (the naming strategy of the sequel) has a marginally significant and positive coefficient (β=1610.324, p-value=0.0769), supporting H4 (the related naming strategy positively affects the box office revenue of the sequel). This result suggests that for brand extensions, the association between the parent brand and the extension should be made as salient as possible. And the related naming strategy is one of the ways to achieve higher association. H2a-H2d proposed that the fitness (star continuity, rating continuity, season continuity and season continuity) between the parent movie and the sequel significantly affects the box office revenue of the sequel. However,

in contrast to my hypotheses, none of the four variables SC, RC, SEC and GC is found to be significant. Therefore, there is no evidence that the fitness between the parent movie and the sequel has an impact on the box office performance of the sequel. The non significant result of star continuity (SC) is out of my expectation and contradictory to the previous studies. In terms of the rating continuity (RC), one possible reason is that in my sample, 105 out of 143 sequels are rated the same as their parent movies. To better explain the role of rating continuity, sequels rated differently from the parent movies can be included in the sample. For SEC (season continuity), the unexpected result may due to the way I measure that variable. According to Hennig-Thurau, Houston and Heitjans (2009) study, SEC is defined as the difference in month between release of parent movie and sequel. For example, if the parent movie was released in December and the sequel was released in January, the SEC of this sequel gets the value 1, which means the sequel keeps relatively high season continuity. However, based on the seasonality found by Litman (1983), December is the peak season, while January is the low season. In this case, this season continuity of the sequel is low rather than high. Therefore, the measure of the variable SEC (season continuity) may lead to the non significant result. In order to further investigate the role of season continuity, a better way of measuring it should be considered. For the genre continuity (GC), Sood and Dreze (2006) proposed that sequels introducing a new story line of different genre from the parent movie are better evaluated. However, GC does not get significant result ($\beta$=654.69, p-value=0.70) in my regression. Thus, H2d (the genre continuity is negatively related to the box office revenue of the sequel) is not supported. One probable reason is the way movies are classified into different genres. In film theory, there is no fixed way of determining it. Moreover,

although it is common to see that a movie is classified into more than one genre, www.the-numbers usually only provides the most important genre of the movie. Therefore, for the sequels of action movies, for example, even if they add more romantic element into the sequels, they may still be considered as action movie rather than action and romantic movie. Besides, in terms of the moderating role of time interval, neither INTERVAL (the time interval between the release of the parent movie and the sequel) nor the interaction term REVPARENT*INTERVAL is found to be significant. Therefore, H3 (*the longer the time interval between the release of the parent movie and the sequel, the weaker the box office revenue of the parent movie affects the box office revenue of the sequel*) is not supported. Finally, the coefficient for the interaction term: SEQUEL*REVINTERVENING is not significant (β=1.80e-06, p-value=0.51). So H5 (the effect of the box office performance of the most recent intervening sequel on the subsequent sequel is significant and positive) is not supported.

Finally, of the control variables, adhering to previous marketing research, it is found that BUDGET (β=3.04e-04, p-value=0.0000) has a significant and positive effect on the box office revenue of the sequel. Furthermore, the Oscar nomination and winning plays a strong role in improving the box office performance of the sequel, given the coefficient of AWARD is marginally significant and positive (β=1465.957, p-value=0.0525). In addition, the critical review (CRR) is significantly positive (β=1102.497, p-value=0.000), showing that consumer's attitudes toward the sequel highly depends on the critical reviews. In terms of the MPAA rating, it is found that the coefficient of M_PG_13 also has a marginally significant and positive coefficient (β=1098.186, p-value=0.1045), while no significance is found for the variable M_G and M_PG. Thus, sequels rated PG_13 get

higher box office revenue compares with others. For movie genres, G_ACT and G_DRAM are found to be significant. G_ACT has a negative coefficient (β=-1539.541, p-value=0.0413). And the coefficient for G_DRAM is also negative (β=-5670.887, p-value=0.0003). So it suggests that the drama and action sequels perform worse than sequels of other genres. Interestingly, none of the 3 dummy variables concerning the release quarter of the sequel is significant.

## *VI. Conclusion and Implication*

Brand extension has become one of the most popular marketing strategies these years (Aaker & Keller 1990; Lahiri & Gupta 2005; Volckner & Sattler 2006). Due to the high production cost and risks in motion picture industry, studios make movie sequels to reduce risks and leverage the brand equity of the parent movies (Basuroy & Chatterjee 2007). In recent marketing research, researchers have addressed the topic of movie sequels from the brand extension perspective (Sood & Dreze 2006; Hennig-Thurau & Heijans 2009; Basuroy & Chatterjee 2008). In this thesis, I adopted the perspective that movie sequels are brand extension of experiential goods and aimed to reveal the box office drivers of movie sequels. I proposed several hypotheses based on the brand extension theory and collected a sample of movie sequels, containing both single sequels and multiple sequels. Based on the previous literature about the drivers of box office revenue in motion picture industry and the hypotheses I would like to test, I assumed a regression model. To satisfy the assumptions of the OLS estimation, I conducted the box-cox transformation and transformed my dependent variable (REVENUE). After this, I tested the proposed hypotheses by the Ordinary Least Square Estimation method. Through the empirical analysis, I find out that the box office revenue of the parent movie is statistically significant and positive related to the box office performance of the sequel. Moreover, sequels using related naming strategy are found to perform better than those using unrelated naming strategy. This result further prove the importance of making the association with the parent brand as salient as possible. However, since I did not find the significance for SC, RC, GC and SEC, H2a~H2d are not supported. H3 and H5 are not supported either. Therefore, there is no evidence found in my thesis towards the role of

fitness between the parent movie and the sequel, moderating role of time interval between the release of the parent movie and the sequel and the positive effect of the box office revenue of the most recent intervening sequel.

The findings in this thesis provide great practical implications. First, at present, most studios make a sequel when the parent movie receive positive response, while some other studios decide to produce a sequel as soon as the parent movie is released or even make a sequel at the same time as the parent movie. Based on the revealed positive relationship between the box office revenue of the parent movie and the sequel, it is reasonable to believe that making a sequel after the parent movie make a success is more reasonable. It is true that the latter behavior mentioned above have some advantages: it is easier for them to have the same casting members, such as directors, producers, actors, actresses and so on, in the parent movie and the sequel; and it may save some money because after the success of the parent movies, actors and actresses may charge much more in the sequel. However, it is very risky. If the parent movie cannot make a hit, it is very likely that the sequel would fail. In this case, making a sequel is never a way of risk reduction, but may even bring more loss.

Second, in terms of the naming strategy, studios always try to balance between the association with the parent movie and the probable satiation. In this study, my empirical result suggests that related naming strategy is superior to the unrelated naming strategy. Keeping all other factors stable, a sequel using related naming strategy earns much more than if it uses unrelated naming strategy. As discussed in previous marketing literature, the strong role of related naming strategy may due to the fact that it serves as a cue for

consumers to associate the sequel with the parent movie. In this way, consumers' good experience with the parent movie may lead them to evaluate the sequel better.

Third, as the first article introducing the sequential brand extension theory into the study of multiple sequels, I try to investigate the effect of the box office performance of the most recent intervening sequels on the box office revenue of the subsequent sequel. I did not find the hypothesized significant role of the intervening sequel. So I believe that for multiple sequels, the performance of the parent movie rather than the intervening sequels affects the box office revenue of the subsequent movie.

Fourth, studios always would like to know which kind of movies is more suitable to have a sequel. In my study, I find that PG-13 rated sequels are more favored. And drama and action is negatively related to the sequel's box office revenue. Therefore, studios should be more cautious towards whether to make a sequel for drama and action movies.

Fifth, compared with the null regression model mentioned in previous literatures, the model included in this study takes more factors into account, such as the interaction term of the REVPARENT and INTERVAL, NAMING, variables concerning the genre of the sequel and SEQUELINTERVENING. For my full data set, the null model analysis result (See Table 10) shows the log likelihood of -1052.653, while my transformed model (Table 9) gives the log likelihood of -1038.375. To compare which model better explain the data, I calculated the AIC ratio as:

$$AIC = -2\ln(L) + 2q$$

Where ln(L) is the log likelihood and q denotes the number of model parameters. So the AIC ratio for the null model is 2137.306, while the AIC ratio for my model is 2124.75. I can see that the AIC ratio in my model is lower than that in the null model mentioned in

previous literatures. So the regression model raised in this thesis can better explain the box office drivers of movie sequels.

## *VII. Limitation and Future Research*

There are several limitations in my study, which deserves future research.

First, the most obvious limitation of my study is that in terms of the characteristics of movie sequels, not all the factors mentioned in previous literatures are included in my analysis, For example, I did not include the advertising expenditure in my study, since the information concerning the advertising expenditure in not available from the motion picture magazines and websites. However, advertising expenditure is of great importance to the box office revenues. Due to the quickly increased number of movies released every year and the following strong competition, advertising expenditure is need to publicize the movies and attract as much attention as possible. Sawhney and Eliashberg's (1996) study revealed the crucial role of advertising expenditure in the theatrical performance. Advertising expenditure acts as an extrinsic cue to consumers that the movie is of high quality and it interacts with sequels and critical reviews to affect the box office performance of movies (Basuroy et al. 2006). Therefore, future research can try to purchase the advertising expenditure information of each movie sequel to investigate the role of advertising expenditure in the success of movie sequels. Moreover, it will be also interesting to include star power in the analysis. In this way, I may find out whether the star power or the star continuity is more important to the success of movie sequels.

Second, in my study, the interaction terms included is the interaction between the box office revenue of the parent movie and the time interval and the interaction between sequel and the box office revenue of the most recent intervening sequels. However, some other interactions between the independent variables may also need to be considered. For instance, the continuity factors may interact with the genre variables to affect the box

office performance. It is possible that the star continuity is more important to certain movie genres than others.

Third, although I confirmed that the related naming strategy is better than the unrelated naming strategy in improving the box office revenue of movie sequels, I do not empirically compare the two different relating naming strategies: adding a number or a phrase after the name of the parent movie. Sood and Dreze (2006) pointed that compared with the named sequels; numbered sequels are more influenced by the similarity between the parent movies and the sequels. So in the future, quantitative research can be done to address named strategy or numbered strategy can bring more box office revenue to movie sequels.

Fourth, this thesis only examined the theatrical performance of movie sequels. However, in reality, sequels can be distributed in many other channels, such as DVD retail sales, pay television, network television and so on. More research can be done in the future to investigate the success drivers for movie sequels in those different channels and even discuss whether there exist interaction effects among different channels.

In addition, as mentioned by Basuroy and Chatterjee (2008), sequels are regarded as a way to leverage the brand equity of the parent movie. Therefore, it is reasonable to predict that there is actually a reciprocal relationship between the overall revenue of the parent movie and the sequel. It is possible that the success of the sequel will arouse audience interests in reviewing the parent movie. In this way, the DVD rental and sales of the parent movie will increase. So it will be interesting to look at the DVD rental and sales records of the parent movie at the time of the sequel's release and examine the possible reciprocal relationship.

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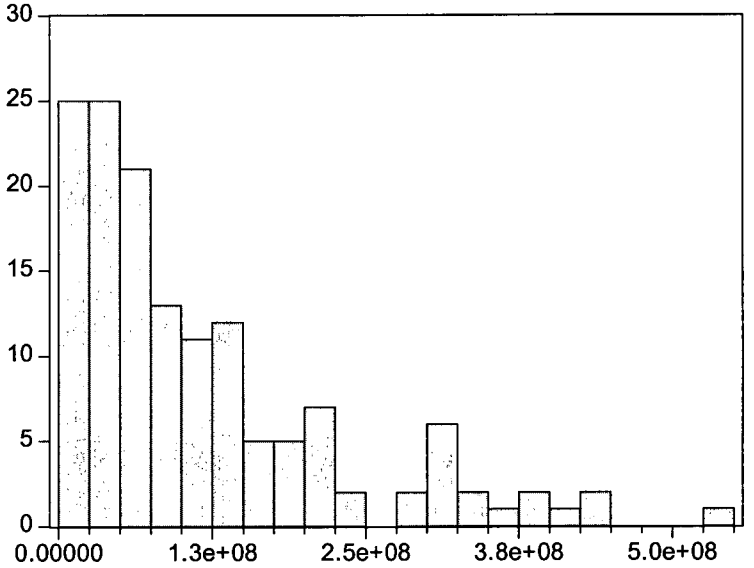
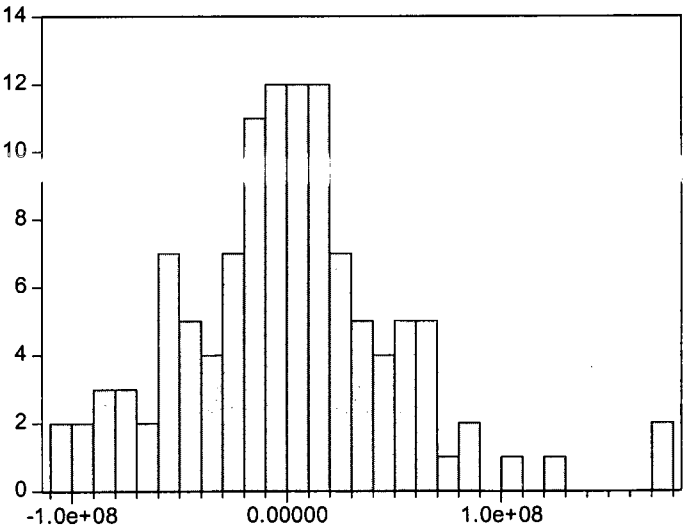
Figure 1 Histogram of dependent variable (REVENUE) in Regression Model

Box Office Revenue of Sequels



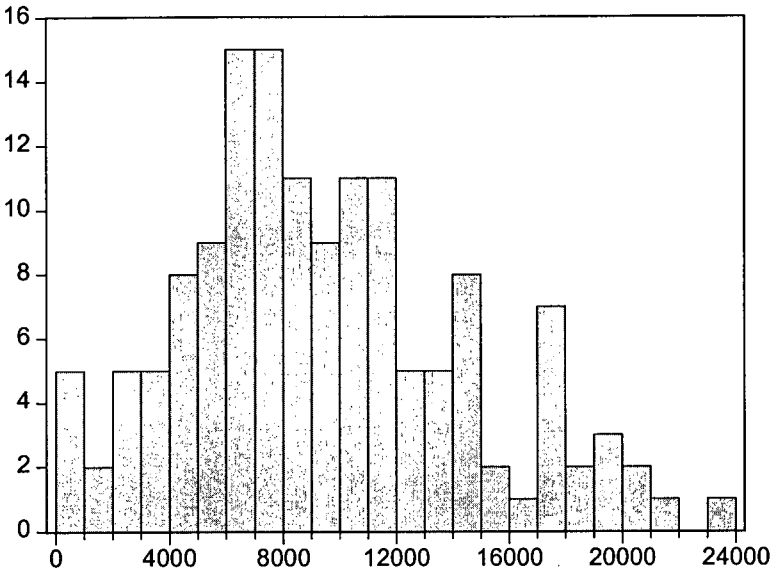

| Series: REVENUE | |
|---|---|
| Sample 1 143 | |
| Observations 143 | |
| Mean | 1.13e+08 |
| Median | 75986503 |
| Maximum | 5.33e+08 |
| Minimum | 10921.00 |
| Std. Dev. | 1.10e+08 |
| Skewness | 1.506387 |
| Kurtosis | 4.861087 |
| Jarque-Bera | 74.72017 |
| Probability | 0.000000 |

Figure 2 Histogram of Residuals in Regression Model



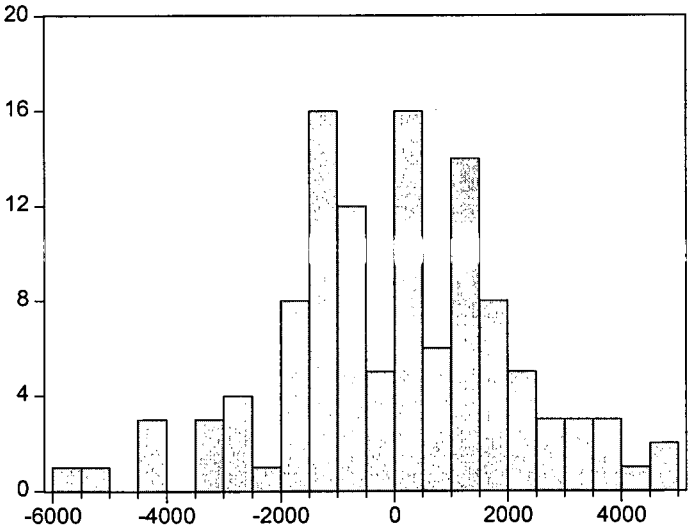

| Series: RESIDOR | |
|---|---|
| Sample 1 143 | |
| Observations 115 | |
| Mean | 2.73e-08 |
| Median | -250725.5 |
| Maximum | 1.75e+08 |
| Minimum | -1.05e+08 |
| Std. Dev. | 50501156 |
| Skewness | 0.576192 |
| Kurtosis | 4.425112 |
| Jarque-Bera | 16.09489 |
| Probability | 0.000320 |

Figure 3 Histogram of Transformed Dependent Variable (REVENUE_TR)




| Series: REVENUE_TR | |
|---|---|
| Sample 1 143 | |
| Observations 143 | |
| Mean | 9403.059 |
| Median | 8717.024 |
| Maximum | 23094.27 |
| Minimum | 104.5036 |
| Std. Dev. | 4962.073 |
| Skewness | 0.482180 |
| Kurtosis | 2.825491 |
| Jarque-Bera | 5.722641 |
| Probability | 0.057193 |

Figure 4 Histogram of Residuals in Transformed Regression Model




| Series: Residuals | |
|---|---|
| Sample 1 143 | |
| Observations 115 | |
| Mean | 1.09e-12 |
| Median | 78.05310 |
| Maximum | 4768.184 |
| Minimum | -5506.844 |
| Std. Dev. | 2027.946 |
| Skewness | -0.118648 |
| Kurtosis | 3.130441 |
| Jarque-Bera | 0.351345 |
| Probability | 0.838893 |

Table 1 Summary of the Proposed Hypotheses and the Underlying Reasons

| Proposed Hypotheses | Underlying Reasons |
|---|---|
| H1: The box office performance of the parent movie significantly and positively affects the box office revenue of the sequel. | In brand extension, higher perceived quality of the parent brand leads to higher acceptability of the extension. |
| H2a: Star continuity is positively related to the box office revenue of movie sequels.<br><br>H2b: Rating continuity significantly and positively affects the box office revenue of movie sequels.<br><br>H2c: Season continuity has a positive and significant effect on the box office revenue of movie sequels.<br><br>H2d: Genre continuity has a negative relationship with the box office performance of the sequels | Fitness between the parent brand and the extension |
| H3: The relationship between the box office performance of parent movies and the box office performance of sequels is moderated by the time interval between the release of the parent movie and that of the movie sequel. | Memory decay curve |
| H4: The box office revenue of the most recent intervening sequel is positively and significantly related to the box office revenue of the subsequent movie sequel. | Sequential brand extension theory |
| H5: The related naming strategy positively affects the box office revenue of the motion picture sequel. | Association between the parent brand and the extension |

Table 2 Relevant Descriptive Statistics for the Sample Data

| Variables | Sample value/mean (std. deviation) |
|---|---|
| Total number of movies | 143 |
| Domestic box office revenue, in $ million (REVENUE) | 113 (110) |
| Box office revenue of parent movie (REVPARENT) | 131 (111) |
| Percentage of movies rated G: (Dummy variable M_G) | 2.9% |
| Percentage of movies rated PG (Dummy variable, M_PG) | 21.7% |
| Percentage of movies rated PG-13 (Dummy variable, M_PG_13) | 33.5% |
| Time interval between parent and sequel, in days (INTERVAL) | 3161.1 (3095.8) |
| Percentage of action movies | 37.1% |
| Percentage of adventure movies | 23.8% |
| Percentage of comedy movies | 18.2% |
| Percentage of drama movies | 5.6% |
| Percentage of horror movies | 23.8% |
| Percentage of movies with Oscar winning or nomination (Dummy variable, AWARD) | 20.3% |
| Percentage of multiple sequel movies | 49.7% |
| Percentage of movies using related naming strategy (Dummy variable, NAMING) | 90.9% |
| Production budget, in $ million (BUDGET) | 55.1 |
| Critical Review (REVIEW) | 5.71 (1.53) |
| Box office revenue of the most recent intervening sequel (REVINTERVENING) | 66 (104) |

Table 3 Ramsey RESET Test of Regression Model

| | | | |
|---|---|---|---|
| F-statistic | 5.108884 | Prob. F(1,90) | 0.0262 |
| Log likelihood ratio | 6.349461 | Prob. Chi-Square(1) | 0.0117 |

| . | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -39141691 | 49180012 | -0.795886 | 0.4282 |
| REVPARENT | 0.111845 | 0.123120 | 0.908421 | 0.3661 |
| SC | 9650218. | 16367269 | 0.589605 | 0.5569 |
| RC | 5317775. | 14645893 | 0.363090 | 0.7174 |
| GC | 2652610. | 22508440 | 0.117850 | 0.9064 |
| SEC | -5055055. | 3298461. | -1.532549 | 0.1289 |
| REVPARENT*INTERVAL | -1.79E-06 | 1.48E-05 | -0.120701 | 0.9042 |
| INTERVAL | 1782.753 | 2858.020 | 0.623772 | 0.5344 |
| NAMING | 10642613 | 22043713 | 0.482796 | 0.6304 |
| SEQUEL*REVINTERVENING | 0.005869 | 0.070036 | 0.083801 | 0.9334 |
| BUDGET | 0.401583 | 0.180900 | 2.219913 | 0.0289 |
| AWARD | 18048790 | 22489964 | 0.802526 | 0.4244 |
| G_ACT | -18149386 | 19672917 | -0.922557 | 0.3587 |
| G_ADV | -5673174. | 21256692 | -0.266889 | 0.7902 |
| G_COM | -15280978 | 23003721 | -0.664283 | 0.5082 |
| G_HORR | -20715437 | 22280151 | -0.929771 | 0.3550 |
| G_DRAM | -84217445 | 40272052 | -2.091213 | 0.0393 |
| QUAR1 | -1596793. | 20173007 | -0.079155 | 0.9371 |
| QUAR2 | -10683470 | 17633434 | -0.605864 | 0.5461 |
| QUAR3 | -6341030. | 15545505 | -0.407901 | 0.6843 |
| M_G | 6170617. | 45197298 | 0.136526 | 0.8917 |
| M_PG | 19718764 | 20875486 | 0.944589 | 0.3474 |
| M_PG_13 | 11356350 | 16318172 | 0.695933 | 0.4883 |
| CRR | 15019347 | 5517841. | 2.721961 | 0.0078 |
| FITTED^2 | 1.24E-09 | 5.51E-10 | 2.260284 | 0.0262 |

| | | | |
|---|---|---|---|
| R-squared | 0.815044 | Mean dependent var | 1.29E+08 |
| Adjusted R-squared | 0.765722 | S.D. dependent var | 1.14E+08 |
| S.E. of regression | 55289569 | Akaike info criterion | 38.68373 |
| Sum squared resid | 2.75E+17 | Schwarz criterion | 39.28045 |
| Log likelihood | -2199.314 | Hannan-Quinn criter. | 38.92593 |
| F-statistic | 16.52507 | Durbin-Watson stat | 1.887557 |
| Prob(F-statistic) | 0.000000 | | |

Table 4 Breusch-Pagan-Godfrey Test of Regression Model

| | | | |
|---|---|---|---|
| F-statistic | 1.865248 | Prob. F(23,91) | 0.0199 |
| Obs*R-squared | 36.84507 | Prob. Chi-Square(23) | 0.0337 |
| Scaled explained SS | 39.51039 | Prob. Chi-Square(23) | 0.0174 |

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 4.43E+15 | 3.66E+15 | 1.212031 | 0.2286 |
| REVPARENT | -5226384. | 8981268. | -0.581920 | 0.5621 |
| SC | 1.53E+13 | 1.28E+15 | 0.012003 | 0.9904 |
| RC | 1.87E+15 | 1.15E+15 | 1.626454 | 0.1073 |
| GC | 3.15E+14 | 1.76E+15 | 0.178916 | 0.8584 |
| SEC | -2.25E+14 | 2.52E+14 | -0.895315 | 0.3730 |
| REVPARENT*INTERVAL | -261.8087 | 1115.148 | -0.234775 | 0.8149 |
| INTERVAL | 1.01E+11 | 2.24E+11 | 0.452878 | 0.6517 |
| NAMING | -3.07E+15 | 1.72E+15 | -1.786318 | 0.0774 |
| SEQUEL*REVINTERVEN ING | 806109.5 | 5234836. | 0.153989 | 0.8780 |
| BUDGET | 16963925 | 10279041 | 1.650341 | 0.1023 |
| AWARD | 4.14E+15 | 1.43E+15 | 2.901366 | 0.0047 |
| G_ACT | -2.05E+15 | 1.42E+15 | -1.443475 | 0.1523 |
| G_ADV | -3.24E+15 | 1.66E+15 | -1.952551 | 0.0539 |
| G_COM | -2.44E+15 | 1.73E+15 | -1.408924 | 0.1623 |
| G_HORR | -2.91E+15 | 1.75E+15 | -1.668918 | 0.0986 |
| G_DRAM | -4.81E+15 | 2.86E+15 | -1.678927 | 0.0966 |
| QUAR1 | -8.88E+14 | 1.54E+15 | -0.576762 | 0.5655 |
| QUAR2 | -5.23E+14 | 1.37E+15 | -0.381617 | 0.7036 |
| QUAR3 | 3.33E+14 | 1.21E+15 | 0.275672 | 0.7834 |
| M_G | -2.15E+15 | 3.54E+15 | -0.606631 | 0.5456 |
| M_PG | 1.72E+15 | 1.63E+15 | 1.054016 | 0.2947 |
| M_PG_13 | 9.46E+14 | 1.28E+15 | 0.739487 | 0.4615 |
| CRR | 9.01E+13 | 3.82E+14 | 0.235842 | 0.8141 |

| | | | |
|---|---|---|---|
| R-squared | 0.320392 | Mean dependent var | 2.53E+15 |
| Adjusted R-squared | 0.148623 | S.D. dependent var | 4.70E+15 |
| S.E. of regression | 4.34E+15 | Akaike info criterion | 75.03272 |
| Sum squared resid | 1.71E+33 | Schwarz criterion | 75.60558 |
| Log likelihood | -4290.382 | Hannan-Quinn criter. | 75.26524 |
| F-statistic | 1.865248 | Durbin-Watson stat | 1.730810 |
| Prob(F-statistic) | 0.019893 | | |

Table 5 Correlation Matrix of Independent Variables

| | AWARD | BUDGET | CRR | G_ACT | G_ADV | G_COM | G_DRAM | G_HORR | GC | INTERVAL | M_G | M_PG | M_PG_13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AWARD | 1.00 | 0.26 | 0.62 | 0.02 | 0.39 | -0.19 | 0.12 | -0.22 | -0.12 | 0.21 | -0.07 | 0.10 | 0.16 |
| BUDGET | 0.26 | 1.00 | 0.21 | 0.26 | 0.36 | -0.14 | -0.13 | -0.42 | -0.07 | 0.16 | -0.05 | -0.02 | 0.52 |
| CRR | 0.62 | 0.21 | 1.00 | 0.15 | 0.31 | -0.20 | 0.16 | -0.34 | -0.27 | 0.10 | -0.06 | -0.02 | 0.17 |
| G_ACT | 0.02 | 0.26 | 0.15 | 1.00 | -0.26 | -0.26 | -0.15 | -0.25 | 0.06 | -0.08 | -0.11 | -0.21 | 0.16 |
| G_ADV | 0.39 | 0.36 | 0.31 | -0.26 | 1.00 | -0.22 | -0.12 | -0.35 | -0.22 | 0.10 | -0.08 | 0.39 | 0.24 |
| G_COM | -0.19 | -0.14 | -0.20 | -0.26 | -0.22 | 1.00 | -0.08 | -0.25 | 0.05 | -0.19 | 0.30 | 0.08 | -0.08 |
| G_DRAM | 0.12 | -0.13 | 0.16 | -0.15 | -0.12 | -0.08 | 1.00 | -0.11 | 0.06 | 0.12 | -0.03 | 0.03 | -0.14 |
| G_HORR | -0.22 | -0.42 | -0.34 | -0.25 | -0.35 | -0.25 | -0.11 | 1.00 | 0.18 | 0.08 | -0.08 | -0.22 | -0.33 |
| GC | -0.12 | -0.07 | -0.27 | 0.06 | -0.22 | 0.05 | 0.06 | 0.18 | 1.00 | -0.07 | 0.04 | 0.07 | -0.23 |
| INTERVAL | 0.21 | 0.16 | 0.10 | -0.08 | 0.10 | -0.19 | 0.12 | 0.08 | -0.07 | 1.00 | 0.01 | -0.09 | 0.11 |
| M_G | -0.07 | -0.05 | -0.06 | -0.11 | -0.08 | 0.30 | -0.03 | -0.08 | 0.04 | 0.01 | 1.00 | -0.06 | -0.10 |
| M_PG | 0.10 | -0.02 | -0.02 | -0.21 | 0.39 | 0.08 | 0.03 | -0.22 | 0.07 | -0.09 | -0.06 | 1.00 | -0.36 |
| M_PG_13 | 0.16 | 0.52 | 0.17 | 0.16 | 0.24 | -0.08 | -0.14 | -0.33 | -0.23 | 0.11 | -0.10 | -0.36 | 1.00 |
| NAMING | -0.05 | -0.10 | -0.10 | 0.12 | -0.08 | -0.11 | -0.11 | 0.18 | 0.12 | -0.01 | -0.20 | -0.09 | -0.03 |
| QUAR1 | -0.11 | -0.07 | -0.07 | -0.02 | -0.07 | 0.09 | 0.10 | 0.02 | 0.10 | -0.12 | -0.04 | -0.08 | -0.05 |
| QUAR2 | 0.23 | 0.36 | 0.23 | 0.27 | 0.30 | -0.12 | -0.15 | -0.33 | 0.06 | -0.07 | -0.11 | 0.15 | 0.20 |
| QUAR3 | -0.11 | -0.06 | -0.15 | 0.08 | -0.11 | 0.05 | -0.12 | 0.02 | -0.02 | 0.01 | 0.07 | -0.10 | 0.01 |
| RC | -0.04 | 0.04 | -0.01 | 0.19 | -0.03 | 0.00 | -0.10 | -0.03 | 0.24 | -0.30 | -0.07 | 0.14 | -0.19 |
| REVPARENT | 0.43 | 0.48 | 0.21 | -0.06 | 0.50 | 0.04 | -0.07 | -0.37 | 0.18 | 0.01 | -0.05 | 0.44 | 0.20 |
| SC | -0.13 | 0.00 | 0.10 | 0.17 | 0.05 | 0.14 | -0.03 | -0.35 | 0.03 | -0.36 | 0.16 | 0.09 | 0.00 |
| SEC | -0.11 | -0.06 | -0.05 | 0.17 | 0.00 | 0.03 | 0.04 | -0.11 | -0.16 | -0.05 | -0.05 | 0.05 | -0.08 |
| SEQUELINTERVENING | 0.22 | 0.49 | 0.12 | -0.01 | 0.38 | -0.18 | -0.05 | -0.21 | -0.04 | 0.37 | -0.09 | 0.10 | 0.20 |

Table 5 Correlation Matrix of Independent Variables (Continued)

| | NAMING | QUAR1 | QUAR2 | QUAR3 | RC | REVPARENT | SC | SEC | SEQUELINTERVENING |
|---|---|---|---|---|---|---|---|---|---|
| AWARD | -0.05 | -0.11 | 0.23 | -0.11 | -0.04 | 0.43 | -0.13 | -0.11 | 0.22 |
| BUDGET | -0.10 | -0.07 | 0.36 | -0.06 | 0.04 | 0.48 | 0.00 | -0.06 | 0.49 |
| CRR | -0.10 | -0.07 | 0.23 | -0.15 | -0.01 | 0.21 | 0.10 | -0.05 | 0.12 |
| G_ACT | 0.12 | -0.02 | 0.27 | 0.08 | 0.19 | -0.06 | 0.17 | 0.17 | -0.01 |
| G_ADV | -0.08 | -0.07 | 0.30 | -0.11 | -0.03 | 0.50 | 0.05 | 0.00 | 0.38 |
| G_COM | -0.11 | 0.09 | -0.12 | 0.05 | 0.00 | 0.04 | 0.14 | 0.03 | -0.18 |
| G_DRAM | -0.11 | 0.10 | -0.15 | -0.12 | -0.10 | -0.07 | -0.03 | 0.04 | -0.05 |
| G_HORR | 0.18 | 0.02 | -0.33 | 0.02 | -0.03 | -0.37 | -0.35 | -0.11 | -0.21 |
| GC | 0.12 | 0.10 | 0.06 | -0.02 | 0.24 | 0.18 | 0.03 | -0.16 | -0.04 |
| INTERVAL | -0.01 | -0.12 | -0.07 | 0.01 | -0.30 | 0.01 | -0.36 | -0.05 | 0.37 |
| M_G | -0.20 | -0.04 | -0.11 | 0.07 | -0.07 | -0.05 | 0.16 | -0.05 | -0.09 |
| M_PG | -0.09 | -0.08 | 0.15 | -0.10 | 0.14 | 0.44 | 0.09 | 0.05 | 0.10 |
| M_PG_13 | -0.03 | -0.05 | 0.20 | 0.01 | -0.19 | 0.20 | 0.00 | -0.08 | 0.20 |
| NAMING | 1.00 | 0.00 | -0.13 | -0.02 | 0.31 | -0.03 | 0.11 | 0.06 | 0.03 |
| QUAR1 | 0.00 | 1.00 | -0.20 | -0.06 | 0.13 | -0.07 | 0.14 | 0.05 | -0.14 |
| QUAR2 | -0.13 | -0.20 | 1.00 | -0.49 | 0.03 | 0.52 | 0.10 | -0.12 | 0.27 |
| QUAR3 | -0.02 | -0.06 | -0.49 | 1.00 | -0.04 | -0.28 | 0.07 | 0.18 | -0.17 |
| RC | 0.31 | 0.13 | 0.03 | -0.04 | 1.00 | 0.16 | 0.30 | 0.00 | 0.01 |
| REVPARENT | -0.03 | -0.07 | 0.52 | -0.28 | 0.16 | 1.00 | 0.00 | -0.31 | 0.46 |
| SC | 0.11 | 0.14 | 0.10 | 0.07 | 0.30 | 0.00 | 1.00 | 0.19 | -0.11 |
| SEC | 0.06 | 0.05 | -0.12 | 0.18 | 0.00 | -0.31 | 0.19 | 1.00 | -0.13 |
| SEQUELINTERVENING | 0.03 | -0.14 | 0.27 | -0.17 | 0.01 | 0.46 | -0.11 | -0.13 | 1.00 |

Table 6 Box-Cox Transformation

| Lambda | R-Square | Log Like |
|---|---|---|
| -3.00 | 0.43 | -4057.16 |
| -2.75 | 0.43 | -3873.85 |
| -2.50 | 0.43 | -3685.50 |
| -2.25 | 0.43 | -3498.41 |
| -2.00 | 0.43 | -3312.72 |
| -1.75 | 0.43 | -3128.83 |
| -1.50 | 0.43 | -2947.25 |
| -1.25 | 0.43 | -2768.80 |
| -1.00 | 0.44 | -2594.79 |
| -0.75 | 0.45 | -2427.57 |
| -0.50 | 0.48 | -2271.99 |
| -0.25 | 0.58 | -2139.95 |
| 0.00 | 0.72 | -2053.77 |
| 0.25 | 0.79 | -2018.97 |
| 0.50 + | 0.82 | -2015.55 < |
| 0.75 | 0.81 | -2029.47 |
| 1.00 | 0.79 | -2053.83 |
| 1.25 | 0.77 | -2084.48 |
| 1.50 | 0.74 | -2118.97 |
| 1.75 | 0.70 | -2155.95 |
| 2.00 | 0.67 | -2194.70 |
| 2.25 | 0.64 | -2234.84 |
| 2.50 | 0.61 | -2276.10 |
| 2.75 | 0.58 | -2318.35 |
| 3.00 | 0.55 | -2361.44 |

< - Best Lambda
* - 95% Confidence Interval
+ - Convenient Lambda

Table 7 Ramsey RESET Test of the Transformed Regression Model

| | | | | |
|---|---|---|---|---|
| F-statistic | 2.631817 | Prob. F(1,90) | | 0.1082 |
| Log likelihood ratio | 3.314645 | Prob. Chi-Square(1) | | 0.0687 |
| | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -3833.287 | 2291.988 | -1.672473 | 0.0979 |
| REVPARENT | 1.35E-05 | 5.45E-06 | 2.486208 | 0.0148 |
| SC | 348.7485 | 663.9625 | 0.525253 | 0.6007 |
| RC | 746.9755 | 602.6016 | 1.239584 | 0.2184 |
| GC | 847.5943 | 922.1759 | 0.919124 | 0.3605 |
| SEC | -269.0390 | 137.4764 | -1.956983 | 0.0534 |
| REVPARENT*INTERVAL | 2.00E-11 | 5.79E-10 | 0.034600 | 0.9725 |
| INTERVAL | 0.068858 | 0.116205 | 0.592554 | 0.5550 |
| NAMING | 2033.984 | 929.4623 | 2.188345 | 0.0312 |
| SEQUEL*REVINTERVENING | 3.18E-06 | 2.85E-06 | 1.117913 | 0.2666 |
| BUDGET | 4.38E-05 | 9.81E-06 | 4.462754 | 0.0000 |
| AWARD | 2389.593 | 933.3344 | 2.560275 | 0.0121 |
| G_ACT | -2231.111 | 851.5095 | -2.620184 | 0.0103 |
| G_ADV | -242.6868 | 862.2320 | -0.281463 | 0.7790 |
| G_COM | -1180.298 | 938.6304 | -1.257468 | 0.2118 |
| G_HORR | -1000.247 | 911.4921 | -1.097373 | 0.2754 |
| G_DRAM | -7451.114 | 1847.312 | -4.033490 | 0.0001 |
| QUAR1 | 573.4311 | 826.1972 | 0.694061 | 0.4894 |
| QUAR2 | -348.5015 | 712.5993 | -0.489057 | 0.6260 |
| QUAR3 | -62.26636 | 629.5080 | -0.098913 | 0.9214 |
| M_G | 1874.606 | 1865.265 | 1.005008 | 0.3176 |
| M_PG | 1475.214 | 859.3155 | 1.716732 | 0.0895 |
| M_PG_13 | 1372.305 | 684.9354 | 2.003554 | 0.0481 |
| CRR | 1465.861 | 299.0433 | 4.901835 | 0.0000 |
| FITTED^2 | -1.81E-05 | 1.11E-05 | -1.622287 | 0.1082 |
| R-squared | 0.829186 | Mean dependent var | | 10286.56 |
| Adjusted R-squared | 0.783636 | S.D. dependent var | | 4836.552 |
| S.E. of regression | 2249.722 | Akaike info criterion | | 18.46466 |
| Sum squared resid | 4.56E+08 | Schwarz criterion | | 19.06139 |
| Log likelihood | -1036.718 | Hannan-Quinn criter. | | 18.70687 |
| F-statistic | 18.20370 | Durbin-Watson stat | | 1.827049 |
| Prob(F-statistic) | 0.000000 | | | |

Table 8 Breusch-Pagan-Godfrey Test of the Transformed Model

| | | | |
|---|---|---|---|
| F-statistic | 1.565996 | Prob. F(23,91) | 0.0700 |
| Obs*R-squared | 32.61005 | Prob. Chi-Square(23) | 0.0881 |
| Scaled explained SS | 21.75094 | Prob. Chi-Square(23) | 0.5353 |

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 10963142 | 4776231. | 2.295354 | 0.0240 |
| REVPARENT | -0.002604 | 0.011727 | -0.222005 | 0.8248 |
| SC | 1288916. | 1667245. | 0.773081 | 0.4415 |
| RC | 1727233. | 1497890. | 1.153110 | 0.2519 |
| GC | 1136558. | 2301523. | 0.493828 | 0.6226 |
| SEC | -333201.5 | 328861.2 | -1.013198 | 0.3137 |
| REVPARENT*INTERVAL | -8.16E-07 | 1.46E-06 | -0.560293 | 0.5767 |
| INTERVAL | 282.1510 | 292.2545 | 0.965429 | 0.3369 |
| NAMING | -722243.8 | 2245005. | -0.321711 | 0.7484 |
| SEQUEL*REVINTERVENING | -0.001996 | 0.006835 | -0.291984 | 0.7710 |
| BUDGET | 0.016062 | 0.013422 | 1.196699 | 0.2345 |
| AWARD | 4553556. | 1861322. | 2.446410 | 0.0164 |
| G_ACT | -3983246. | 1855150. | -2.147128 | 0.0344 |
| G_ADV | -5617297. | 2169787. | -2.588870 | 0.0112 |
| G_COM | -4262783. | 2261763. | -1.884717 | 0.0627 |
| G_HORR | -8147660. | 2279415. | -3.574453 | 0.0006 |
| G_DRAM | -9695367. | 3740058. | -2.592304 | 0.0111 |
| QUAR1 | -3194975. | 2010780. | -1.588923 | 0.1155 |
| QUAR2 | -876081.2 | 1789266. | -0.489632 | 0.6256 |
| QUAR3 | -1265321. | 1577967. | -0.801868 | 0.4247 |
| M_G | -6134574. | 4628487. | -1.325395 | 0.1884 |
| M_PG | -1277074. | 2133949. | -0.598456 | 0.5510 |
| M_PG_13 | -897413.8 | 1670542. | -0.537199 | 0.5924 |
| CRR | -505561.1 | 498667.6 | -1.013824 | 0.3134 |

| | | | |
|---|---|---|---|
| R-squared | 0.283566 | Mean dependent var | 4076804. |
| Adjusted R-squared | 0.102489 | S.D. dependent var | 5976558. |
| S.E. of regression | 5662016. | Akaike info criterion | 34.11978 |
| Sum squared resid | 2.92E+15 | Schwarz criterion | 34.69263 |
| Log likelihood | -1937.887 | Hannan-Quinn criter. | 34.35230 |
| F-statistic | 1.565996 | Durbin-Watson stat | 2.087959 |
| Prob(F-statistic) | 0.069963 | | |

Table 9 OLS Estimation Result of the Transformed Model

Dependent Variable: REVENUE_TR

| Variables | Coefficient | Prob. |
|---|---|---|
| C | -1748.356 | 0.3636 |
| REVPARENT | 8.97E-06 | 0.0596* |
| SC | 276.2306 | 0.6804 |
| RC | 593.8710 | 0.3253 |
| GC | 654.6914 | 0.4798 |
| SEC | -199.7245 | 0.1332 |
| REVPARENT*INTERVAL | -1.12E-11 | 0.9848 |
| INTERVAL | 0.061789 | 0.5992 |
| NAMING | 1610.324 | 0.0769* |
| SEQUEL*REVINTERVENING | 1.80E-06 | 0.5125 |
| BUDGET | 3.04E-05 | 0.0000** |
| AWARD | 1465.957 | 0.0525* |
| G_ACT | -1539.541 | 0.0413** |
| G_ADV | -263.7721 | 0.7624 |
| G_COM | -740.7728 | 0.4161 |
| G_HORR | -833.7122 | 0.3640 |
| G_DRAM | -5670.887 | 0.0003** |
| QUAR1 | 232.0841 | 0.7741 |
| QUAR2 | -269.6466 | 0.7078 |
| QUAR3 | -153.6453 | 0.8086 |
| M_G | 1369.194 | 0.4625 |
| M_PG | 1248.683 | 0.1478 |
| M_PG_13 | 1098.186 | 0.1045* |
| CRR | 1102.497 | 0.0000** |

| | | | |
|---|---|---|---|
| R-squared | 0.824191 | Mean dependent var | 10286.56 |
| Adjusted R-squared | 0.779756 | S.D. dependent var | 4836.552 |
| S.E. of regression | 2269.803 | Akaike info criterion | 18.47609 |
| Sum squared resid | 4.69E+08 | Schwarz criterion | 19.04895 |
| Log likelihood | -1038.375 | Hannan-Quinn criter. | 18.70861 |
| F-statistic | 18.54813 | Durbin-Watson stat | 1.786346 |
| Prob(F-statistic) | 0.000000 | | |

**Significant at $p<0.05$

*Significant at $p<0.1$

Table 10 OLS Estimation Result of the Null Model

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -105.0181 | 1654.337 | -0.063480 | 0.9495 |
| REVPARENT | 1.22E-05 | 3.78E-06 | 3.216604 | 0.0018 |
| SC | 468.1798 | 682.0120 | 0.686469 | 0.4940 |
| RC | 970.7609 | 613.8998 | 1.581302 | 0.1170 |
| GC | -280.0102 | 948.1132 | -0.295334 | 0.7684 |
| SEC | -256.1141 | 134.6233 | -1.902451 | 0.0600 |
| INTERVAL | 0.087548 | 0.090194 | 0.970658 | 0.3341 |
| BUDGET | 2.95E-05 | 5.16E-06 | 5.717847 | 0.0000 |
| AWARD | 1342.781 | 794.3635 | 1.690386 | 0.0941 |
| QUAR1 | -268.2157 | 850.5126 | -0.315358 | 0.7532 |
| QUAR2 | -419.7848 | 676.2093 | -0.620791 | 0.5362 |
| QUAR3 | -74.16391 | 636.9012 | -0.116445 | 0.9075 |
| M_G | 991.8228 | 1871.712 | 0.529901 | 0.5974 |
| M_PG | 1263.698 | 823.0059 | 1.535467 | 0.1279 |
| M_PG_13 | 1371.346 | 680.5565 | 2.015036 | 0.0466 |
| CRR | 913.7460 | 204.6864 | 4.464127 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.774640 | Mean dependent var | 10286.56 |
| Adjusted R-squared | 0.740495 | S.D. dependent var | 4836.552 |
| S.E. of regression | 2463.819 | Akaike info criterion | 18.58526 |
| Sum squared resid | 6.01E+08 | Schwarz criterion | 18.96716 |
| Log likelihood | -1052.653 | Hannan-Quinn criter. | 18.74027 |
| F-statistic | 22.68652 | Durbin-Watson stat | 1.720752 |
| Prob(F-statistic) | 0.000000 | | |

# Appendix A

## List of Movie Sequels

| Item | Movie | Item | Movie |
|---|---|---|---|
| 1 | Underworld: Evolution | 37 | Rocky IV |
| 2 | Manderlay | 38 | Rocky V |
| 3 | Big Momma's House 2 | 39 | Rocky Balboa |
| 4 | Final Destination 2 | 40 | The Hills Have Eyes II |
| 5 | Final Destination 3 | 41 | Spider-Man 2 |
| 6 | Basic Instinct 2 | 42 | Spider-Man 3 |
| 7 | Ice Age: The Meltdown | 43 | 28 Weeks Later |
| 8 | Scary Movie 2 | 44 | Fay Grim |
| 9 | Scary Movie 3 | 45 | Shrek 2 |
| 10 | Scary Movie 4 | 46 | Shrek the Third |
| 11 | Mission Impossible 2 | 47 | Pirates of the Caribbean: Dead Man's Chest |
| 12 | Mission: Impossible III | 48 | Pirates of the Caribbean: At World's End |
| 13 | X2 | 49 | Belle Toujours |
| 14 | X-Men: The Last Stand | 50 | Hostel: Part II |
| 15 | Garfield's A Tail of Two Kitties | 51 | Ocean's Twelve |
| 16 | 2 Fast 2 Furious | 52 | Ocean's Thirteen |
| 17 | The Fast and the Furious: Tokyo Drift | 53 | Fantastic Four: Rise of the Silver Surfer |
| 18 | Krrish | 54 | Evan Almighty |
| 19 | Clerks II | 55 | Die Hard 2 |
| 20 | Jackass: Number Two | 56 | Die Hard: With a Vengeance |
| 21 | The Texas Chainsaw Massacre 2 | 57 | Live Free or Die Hard |
| 22 | leatherface: Texas Chainsaw Massacre III | 58 | Daddy Day Camp |
| 23 | The Texas Chainsaw Massacre | 59 | Rush Hour 2 |
| 24 | The Texas Chainsaw Massacre: The Beginnin | 60 | Rush Hour 3 |
| 25 | The Grudge 2 | 61 | Mr. Bean's Holiday |
| 26 | Saw II | 62 | Halloween II |
| 27 | Saw III | 63 | Halloween 3; Season of the Witch |
| 28 | Saw IV | 64 | Halloween 4: The Return of Michael Myers |
| 29 | Saw V | 65 | Halloween 5: The Revenge of Michael Myers |
| 30 | The Santa Clause 2 | 66 | Halloween: The Curse of Michael Myers |
| 31 | The Santa Clause 3: The Escape Clause | 67 | Halloween: H2O |
| 32 | Eating Out 2: Sloppy Seconds | 68 | Halloween: Resurrection |
| 33 | Dhoom 2 | 69 | Halloween |
| 34 | Van Wilder Deux: The Rise of Taj | 70 | Resident Evil: Apocalypse |
| 35 | Rocky 2 | 71 | Resident Evil: Extinction |
| 36 | Rocky 3 | 72 | Elizabeth: The Golden Age |

| Item | Movie | Item | Movie |
|---|---|---|---|
| 73 | National Treasure: The Book of Secrets | 109 | Amrican Pie 2 |
| 74 | Aliens | 110 | Beverly Hills Cop 2 |
| 75 | Alien 3 | 111 | Beverly Hills Cop 3 |
| 76 | Alien Resurrection | 112 | Blade 2 |
| 77 | AVP: Alien Vs. Predator | 113 | Blade: Trinity |
| 78 | Aliens vs. Predator - Requiem | 114 | Superman 2 |
| 79 | Rambo: First Blood Part II | 115 | Superman 3 |
| 80 | Rambo III | 116 | Superman 4: The Quest for Peace |
| 81 | Rambo | 117 | Superman Returns |
| 82 | Step Up 2 the Streets | 118 | Back to the Future Part 2 |
| 83 | Harold & Kumar Escape from Guantanamo B | 119 | Back to the Future Part 3 |
| 84 | Indiana Jones and the Last Crusade | 120 | The Godfather: Part II |
| 85 | Indiana Jones and the Kingdom of the Crystal | 121 | The Godfather: Part III |
| 86 | The Incredible Hulk | 122 | The Matrix Reloaded |
| 87 | Hellboy 2: The Golden Army | 123 | The Matrix Revolutions |
| 88 | Batman Returns | 124 | The lord of the rings: the fellowship of the ring |
| 89 | Batman: Mask of the Phantasm | 125 | The lord of the rings: the two towers |
| 90 | Batman Forever | 126 | The lord of the rings: the return of the king |
| 91 | Batman & Robin | 127 | Terminator 2: Judgement Day |
| 92 | Batman Begins | 128 | Terminator 3: Rise of the Machines |
| 93 | The Dark Knight | 129 | Jaws 2 |
| 94 | The X-Files: I Want to Believe | 130 | Jaws 3-D |
| 95 | The Mummy Returns | 131 | Jaws 4: The Revenge |
| 96 | The Mummy: Tomb of the Dragon Emperor | 132 | Mad Max 2: The Road Warrior |
| 97 | The Sisterhood of the Traveling Pants 2 | 133 | Mad Max Beyond Thunderdome |
| 98 | Star Wars EP. V: The Empire Strikes Back | 134 | Scream 2 |
| 99 | Star Wars EP. VI: Return of the Jedi | 135 | Scream 3 |
| 100 | Star Wars Ep. I: The Phantom Menace | 136 | Spy kids 2: The island of lost dreams |
| 101 | Star Wars Ep. II: Attack of the Clones | 137 | Spy kids 3-D: Game Over |
| 102 | Star Wars Ep. III: Revenge of the Sith | 138 | National Lampoon's European Vacatioin |
| 103 | Star Wars: The Clone Wars | 139 | National Lampoon's Christmas Vacation |
| 104 | Goal! 2: Living the Dream... | 140 | Vegas Vacatioin |
| 105 | Madagascar: Escape 2 Africa | 141 | Barbershop 2: Back in Business |
| 106 | The Transporter 2 | 142 | Home Alone 2: Lost in New York |
| 107 | Transporter 3 | 143 | Home Alone III |
| 108 | Punisher: War Zone | | |

# Appendix B

## Summary of Variables

| Variable Category | sources | # variable | Symbol |
|---|---|---|---|
| Box Office Revenue of Movie Sequels | www.the-numbers.com<br>www.boxofficemojo.com | 1 | REVENUE |
| Box Office Revenue of Parent Movies | www.the-numbers.com<br>www.boxofficemojo.com | 1 | REVPARENT |
| Star Continuity | www.boxofficemojo.com<br>www.imdb.com | 1 | SC |
| Rating Continuity | www.the-numbers.com | 1 | RC |
| Season Continuity | www.the-numbers.com | 1 | SEC |
| Genre Continuity | www.the-numbers.com | 1 | GC |
| Time Interval | www.the-numbers.com | 1 | INTERVAL |
| Naming Strategy | www.the-numbers.com | 1 | NAMING |
| Box Office Revenue of the Most Intervening Sequel | www.the-numbers.com<br>www.boxofficemojo.com | 1 | REVINTERVENING |
| Multiple Sequel | www.the-numbers.com<br>www.boxofficemojo.com | 1 | SEQUEL |
| Major Genre | www.the-numbers.com | 5 | G_ACT, G_ADV, G_COM, G_HORR, G_DRAM |
| Release Quarter | www.the-numbers.com | 3 | Quar1, Quar2, Quar3 |
| MPAA Ratings | www.the-numbers.com | 3 | M_G, M_PG, M_PG_13 |
| Critical Reviews | www.rottentomato.com | 1 | CRR |
| Budget | www.the-numbers.com | 1 | BUDGET |
| Award or nomination | www.boxofficemojo.com | 1 | AWARD |