

# **Hollywood and its Global Reach: Analyzing Key Drivers of Movie Demand in Foreign Markets**

by

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**A Thesis  
Presented to  
The University of Guelph**

**In partial fulfillment of requirements  
for the degree of  
Master of Science  
in  
Marketing and Consumer Studies**

**Guelph, Ontario, Canada**

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## **ABSTRACT**

### **HOLLYWOOD AND ITS GLOBAL REACH: ANALYZING KEY DRIVERS OF MOVIE DEMAND IN FOREIGN MARKETS**

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Existing studies have examined how cultural differences between movie producing countries and foreign audiences influence consumption, but most of them ignore the releasing stage. This study extends research on cultural impacts in the international marketing of movie industry by examining both distributors' decisions on exporting movies and audiences' decisions on watching movies. Using the dataset of Hollywood 769 wide release movie in 56 foreign countries during 2012-2016 as an example, this study obtains both movie factors and country factors in the two steps of Heckman model. The results indicate that distributors prefer to release movies in countries that have similar cultures, and that moviegoers from culturally distant countries prefer Hollywood movies. These findings offer practical implications to distributors, because they can modify the releasing strategy to enhance the audiences' movie watching experience.

**Keywords:** Hollywood movies; Cultural distance; National culture; Heckman selection model

## ACKNOWLEDGEMENTS

First and foremost, I would like to thank my advisor Dr. Tirtha Dhar and committee member Dr. Vinay Kanetkar for their inspiration, encouragement, guidance and patience throughout the whole thesis process. Starting from the very beginning, they are always here to lead me to the right direction and support me whenever I encounter difficulties.

Secondly, I would like to thank Dr. Towhidul Islam for his instructive teaching about statistics and software application. I would also like to thank Dr. Jian Zhou for his insightful comments and continued support and encouragement.

In addition, I would like to express my gratitude to Dr. Brent McKenzie, Dr. Sunghwan Yi, Dr. Timothy Dewhirst. Thanks for their teaching, I benefited a lot from their interesting classes.

I also want to thank our Administrative Assistant Rita Raso, Program Assistant Domenica Alderton, Alanna Reid, Raquel Beitz, Corinna Wells and Melinda Heijil. They are always here listen to my problems and requests and offer me suggestions and help. Also, I want to thank my classmates. Because of them, I had a wonderful time for in the past two years.

At last, I would like to thank my parents for their trust and unconditional support. Without them, I would not have this amazing journey and make it this far. Their love is the infinite motivation of my life. This thesis is dedicated to them.

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## **Chapter 1: Introduction**

The motion picture industry has gained the interest of researchers and practitioners. The surge in academic and practical interest in the topic of cultural factors highlight a cultural impact on the international movie industry. According to the definition of Hofstede (2001), culture is the “collective programming of the mind that distinguishes the members of one group or category of people from another”. Thus, culture determines how phenomena are perceived and interpreted by people (McCracken, 1986). Furthermore, national culture has greatly influenced cultural production and cultural consumption (Akdeniz & Talay, 2013). Movies, as typical cultural products, reflect the culture of the society in which they are created (Craig et al., 2005)

Previous research has illustrated the cultural influence on the movie performance. Occupying majority of the global movie industry, Hollywood movies have been used to research the cultural influence on movies. Craig, Greene, & Douglas (2005) propose a study to measure the foreign market’s acceptance of Hollywood movies. The results of this study indicate that Hollywood films are more likely to achieve success in those countries which are culturally closer to the United States. Other studies also find distant culture has a negative influence on Hollywood movies’ international success (Lee, 2006; Fu & Govindaraju, 2010).

Most studies in this field only focus on the movie box office performance, but they ignore the two stages before an actual performance: distribution and exhibition. Lee (2009) states that there are 212 out of 585 movies data missing in the Hong Kong market during 2002-2007. That unavailability could attribute to two reasons: the movies are not released in Hong Kong, or the movies released but the box office data is unavailable. It is unmanageable to determine each

movie, so all the missing data is ascribed to not released. Consistent to this processing method, Kim and Jensen (2014) also state that most films never have a chance to export to the foreign market, and 64% of produced movies were not cross-border during 2004-2009. By now, there is limited research examines this part. Only Kim & Jensen (2014) estimate two aspects of a movie, exporting possibility and the actual success, and they find cultural distance negatively moderates positive relationship of domestic box office the exporting likelihood. Although the authors already shed light on the cultural impact on the unobservable distribution possibility, it ignores the hierarchical nature of international movie industry.

The aim of this study is to investigate the cultural influence on distributors' decisions on exporting movies and audiences' decisions on watching movies. This study employs the Heckman two-stage selection model with country and movie specific variables. For the two stages of Heckman selection model, the first stage captures the distributors' aspect, exporting likelihood of a movie in a country, and the second stage seizes the moviegoers' aspect, the box office of a movie in a country. The Hierarchical Linear Model is applied in both stages to specify the movie-level and country-level variables.

This paper is organized in the following contents. Firstly, it reviews the literature about the Hollywood's domain in movie industry and its international markets, Hofstede's and Schwartz's cultural frameworks definitions and their applications in international movie marketing.

Then, in the hypotheses development, the thesis discusses the specific movie-level variables, country-level variables, and movie-country combined variables. Following that, four hypotheses regarding country-level variables are proposed, including cultural distance, English proficiency, purchasing power parity and releasing day difference between domestic market and foreign markets.

The methodology describes the implement of two step Heckman model. In each step, the movie-level and country-level variables are arranged in a hierarchical structure.

The results part presents the descriptive statistics of dataset, model developments and final model results. All the models are built in an incremental approach. Starting from only intercept, models add movie variables, country variables, and movie-country combined variables. For the comparison between Hofstede's and Schwartz's, two models with the same estimation procedure but restricted dataset are presented.

The major findings were as following: Firstly, this study confirms the different emphasize of Hofstede's and Schwartz's cultural measurement. Secondly, distributors prefer to release movies in countries that have similar culture to the United States, but foreign audiences seek different watching experience through those culturally distant movies. Thirdly, the releasing day differences show non-linear relationship with box office performance.

For theoretical contribution, this is the first study of the cultural impacts on the distributors and foreign audience, and the comparisons of Hofstede's and Schwartz's cultural



framework. Furthermore, this study conducts Heckman two step model to include the distributors' selection bias, offering a comprehensive perspective to investigate the different patterns of movie releasing and movie consumption. For empirical contribution, this study suggest that distributors should modify their relasing strategy based on different cultural background, economic level, and English profeciency of audience. Also, the relasing date should be shifted to ahead of domestic releasing. In the chapter sven, it discusses the limitations and the directions of future research.

## **Chapter 2: Literature review**

### **2.1 Hollywood and the international market**

Miller et al. (2005) state that Hollywood movie industry is global, because “it sells its wares in every nation, through a global system of copyright, promotion, and distribution that uses the New International Division of Cultural Labor to minimize cost and maximize revenue.” Not only the production resources and marketing of Hollywood industry are global, but also the cultural background of Hollywood movies is global. Being addressed as “cultural imperialism” (Boyd-Barrett, 1977; Schiller, 1992; Fu & Lee, 2008) or “dominant paradigm” (Lee, 2008), the phenomenon of American media dominance is explained both in the economic and cultural perspectives (Hoskins & Mirus, 1988; Fu & Lee, 2008). From the micro-economic point of view, the leading role of American media products attributes to the considerable domestic markets, which can be defined both by nation and by language (Lee, 2008). As a result, media producers with larger domestic market could have a greater “effective potential total market” (Waterman & Rogers, 1994). Besides, they can enjoy the optimal budgets (Lee, 2008), and the bigger budgets can produce more attractive products. From the cultural point of view, the United States is a “multicultural melting pot” with diverse social and cultural roots; besides, professional production process and mature marketing tools of Hollywood enhance the market attractiveness (Meisel, 1986; Olson, 1999). According to the annual report of Motion Picture American Association (2012), the Hollywood revenue occupies 63% of the worldwide box office. Put together, Hollywood is dominant in the global movie industry.

The dominant role of American movies is becoming evident worldwide; meanwhile, the international market has occupied increasing market share of American movies (Waterman,

2005). Akdeniz & Talay (2013) conclude that 65% of the Hollywood total revenue comes from the foreign market. According to the annual report of MPAA, the 2016 global box office revenue was 38.6 billion dollars, 71% of which was made by Hollywood.

The two graphs below display the trend of international market box office share and the comparisons of domestic market and international market for those movies produced by six MPAA members from 1990 to 2016. In Figure 1, international market is achieving greater proportion for all six major distributors, including the Sony, Universal, Warner Bros, Fox, Disney and Paramount.

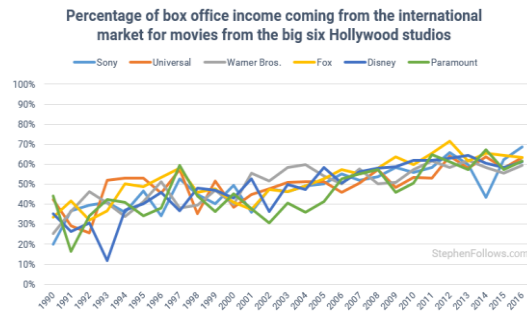


Figure 1: Percentage of box office income coming from the international market for movies from big six Hollywood studios

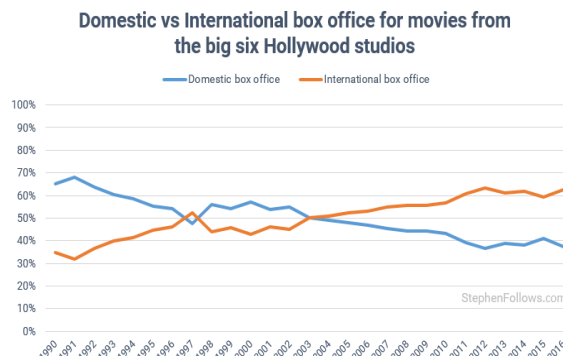


Figure 2: Domestic vs International box office for movies from the big six Hollywood studios

<https://stephenfollows.com/important-international-box-office-hollywood/>

In Figure 2, it indicates that the domestic market is more than the international market share except for 1997, which is mostly due to the three global blockbusters, Titanic, Men in Black and Jurassic Park. It is until 2003 that the international markets began to dominate the domestic market, and this trend is more noticeable since then. The trend is consistent with the statement of Scott (2004b), that the international market is getting increasingly important to Hollywood.

In summary, the Hollywood movie industry is dominating the global movie industry, and the international market is becoming increasingly significant to Hollywood. Therefore, analyzing Hollywood's international market is meaningful.

## **2.2 Distribution**

The stages of movie production, distribution and exhibition involve the relationship of artist, producers, studios and theaters. The distribution of the film involves selecting movie, choosing release date, deciding the opening prints, allocating the screens, and designing the advertising campaign (McKenzie, 2012). Hollywood movies' domestic commercial performance and artistic acclaim help subsequent foreign distributors to decide which film to import and foreign audiences to decide which film to watch (Kim & Jensen, 2014). Therefore, the movie availability of foreign audiences is decided by the distributors. Except for the trade barrier issue, distributors generally "select the films they believe will appeal to audiences, convince theater owners to exhibit them, copy and distribute reels to the theaters, and promote films prior to and after their release" (Sorenson & Waguespack, 2006). Distributors select those movies to target audiences based on the understanding of their taste and the prediction of movie box office performances, and audiences can only access to those movies that distributors regard as

appealing to them. Thus, distributors bridge the gap between movies and audiences.

### **2.3 Culture**

Hofstede (2001) describes culture as the “mental software” and defines culture as “collective programming of the mind that distinguishes the members of one group or category of people from another”. Culture is generally used for societies, which include nations or regions within or beyond nations; furthermore, those within-society human categories interact with the others (Hofstede, 2001). For example, the United States is a society that contains various cultural categories, but Americans can still be recognized to belong to the society because of the shared cultural traits (Hofstede, 2001).

Culture profoundly affects all aspects of behavior and forms the way how experience is shared by the society members (Craig, Greene, & Douglas, 2005). Culture determines how phenomena are perceived and interpreted by people (McCracken, 1986). Clark (1990) also suggests that a specific and established behavior pattern, and personality characteristics constitute each country a unique "national character". Consequently, culture shapes the pattern of conduct, builds the value system, and influences the preferences; however, culture can also inversely hinder ideological communication and act as the barriers to trading products internationally (Craig, Greene, & Douglas, 2005). National culture greatly influences cultural production and cultural consumption (Akdeniz & Talay, 2013). As Ricks (1993) points out, most of the international marketing mistakes attribute to the ignorance of culture impact.

Culture impact is diverse among different product categories, because the cultural implication in the product varies; particularly, those cultural products which have rich culture connotation could be impacted more than the other categories, such as electronics (Moon et al., 2016). Cultural products, as defined by Scott (2004a), is “service output that focus on entertainment, edification, and information (e.g., motion pictures, recorded music, print media, museums) and manufactured products through which consumers conduct distinctive forms of individuality, self-affirmation, and social display (e.g., fashion clothing, jewelry).” Rooted in the cultural background in which they are created, movies not only embrace the daily life but also are full of the imagination of detached reality. Therefore, movies reflect the culture of the society in which they are created (Craig et al., 2005). National culture is a fundamental factor in distinguishing between a country's consumers and another country's (Dwyer, Mesak, & Hsu, 2005). The values of a country profoundly affect the behavior of its consumers (Roth, 1995), so it is practical and meaningful to research how culture influences the movie diffusion at the national level.

## **2.4 Culture discount**

Aimed at explaining the reason why specific countries dominate the international media products flow, economists developed the concept of culture discount (Lee, 2008). According to the definition of Hoskins and Mirus (1988), culture discount refers to the phenomenon that a cultural product “will have a diminished appeal elsewhere as viewers find it difficult to identify with the style, values, beliefs, institutions, and behavioral patterns of the material in question”. The culture discount reflects the fact that information receivers are unable to fully understand those foreign media products, because of the cultural differences, insufficient background

knowledge, and the linguistic distinctions (Lee, 2009). This concept contributes to explain the phenomenon that media audiences prefer local products to the foreign ones (Lee, 2008).

Contrary to the direct implication of culture discount, which would lead the international consumers to prefer local cultural products to American cultural products at the same quality and price (Lee, 2006), Hoskins and Mirus (1988) state that cultural discount inversely account for the American dominance in the global market. The logic is that combining the size of market and the cultural discount rate, the larger market producers could benefit from the optimal production budgets (Hoskins & McFayden, 1993; Papandrea, 1998). Meanwhile, Jayakar & Waterman (2000) display that the economically prosperous countries, especially whose citizens have more expenditure on movies, tend to less dominated by United States and have more domestic box office share. Consequently, the smaller market barely can compete with the larger market, and the America domestic market size contributes to its media domination (Lee, 2006a).

Based on the cultural discount theory, Lee (2006a, 2008, 2009) conducts a series of research on the Hollywood movies' performance in the east Asian markets. Specifically, Lee (2006a) conducts the data of box office of Hollywood movies in Hong Kong from 1989 to 2004, to exam the different degree of cultural discount and cross-culture predictability for movie genres. The results indicate that the comedy is the most culturally discounted while the science fiction is the least affected. Besides, employing the box office data of Hollywood 489 movies released in seven east Asian countries from 2002 to 2006, Lee (2008) analyzes the genre taste similarities among countries. The results still identify that comedy, the most culturally specific genre, encounters the most cultural discount, and adventure is the most universal genre.

Following the line of research on the awards effect, Lee (2009) agrees that the awards are the indicator of film qualities both in market performance and artistic achievement, and that the academy awards are the embodiment of East Asian taste. The author adopts the box office data of 585 movies released in nine East Asian markets from 2002 to 2007, to explore whether the drama awards could be more culturally discounted than non-drama awards. The results prove that drama awards negatively relate to box office, but the non-drama awards positively relate to the box office performance. The negative effect of drama awards is stronger in those countries that have more distant culture from the United States.

## **2.5 Cultural framework**

Marketing research usually looks at culture in three key ways: beliefs and value systems, material goods and languages (Sojka and Tansuhaj, 1995). Those studies inspect the beliefs and value systems often employ the framework of Hofstede (2001) of Schwartz (1992).

### **2.5.1 Hofstede**

As the landmark of culture examination, Hofstede's culture framework is widely applied in marketing and other international business areas (Nakata&Sivakumar, 2001). This study is based on the data collected from more than 160000 questionnaires given to the IBM employees from 72 different countries between 1967 and 1973. Originally, Hofstede (1980) published four dimensions: power distance, uncertainty avoidance, individualism-collectivism, and masculinity-femininity. Gradually, the fifth dimension, long-term orientation (1991), and the sixth dimension, indulgence (2011) are added into this framework. As Hofstede (2001) claims, culture dimensions are based on differences in values, beliefs, and behavior patterns of national cultures worldwide; thus, they offer a perspective to inspect the aggregated individual characters.



Uncertainty avoidance, Hofstede (2001) defines it “the extent to which the members of a culture feel threatened by uncertainty of unknown situation”. Societies embedded in high uncertainty avoidance have a lower tolerance for uncertainty or ambiguousness. New products, such as movies, are generally recognized as “unknown entities” when they enter a country, and consumers must receive and obtain enough information before making purchase decision of a new product (Tellefsen and Takada, 1999). Movies are experience products, as they must be watched and then evaluated by audiences (Moon & Song, 2015). Thus, potential consumers may be uncertain about the advantages that could be provided; particularly, those in the high uncertainty avoidance may delay or even abandon the purchase (Dwyer, Mesak & Hsu, 2005). On the contrary, cultures of low uncertainty avoidance have a higher degree of acceptance for uncertainty, and have the “willingness to take unknown risks” (Hofstede, 2001). Generally, Hofstede summarizes those two mentalities as “what is different, is dangerous” for high uncertainty avoidance and “what is different, is curious” for low uncertainty avoidance. For example, in Akdeniz & Talay (2013)’s study, they examine the moderating effect of culture differences on the relationship between the marketing signals and the opening weekend revenue, and find that the impact of sequel, star power and review budget could be positively moderated in the high uncertainty avoidance cultures.

Power distance is defined as “the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally” (Hofstede, 2001). This dimension attempts to measure the degree of acceptance of social inequality in a society (Hofstede, 2001). In high power distance culture, the powerful attempt to

adopt new products, and the less powerful depends on the powerful to make a purchase decision (Dwyer et al., 2005). In contrast, inequalities are undesired in low power distance culture, and consumers in this culture distrust the press (Hofstede, 2001). Previous researchers argue that the movies signals of sequels and star power have a greater effect in high power distance cultures (Erdem & Valenzuela, 2006; Akdeniz & Talay, 2013).

Individualism-collectivism represents the “we” society and the “me” society, measuring the social ties between individuals and collectives (Hofstede, 2001). In individualist cultures, people's behavior is guided by personal interests, and their goals and motivations have privileges among groups’ (Steenkamp et al., 1999). For collective, they behave in accordance with group interest and even subordinate their own goals to group goals. In movie literature, Griffith, Yalcinkaya, & Rubera (2014) argue that individualism positively moderates the negative relationship between time lag and box office performance.

Masculine countries advocate competition and individual achievements. Meanwhile, they prefer independent decision making and appreciate independence and strength (Hofstede, 2001). Feminine countries tend to cooperate, be modest and nurture the weak (Hofstede, 2001). Following the logic that making decisions independently is essential towards product acceptance when new products enter a country (Tellis, Stefan, and Yin, 2003), adopting new product early is a way to display and maintain social status (Rogers, 2003). The two hypotheses of moderating effect of masculine on the rollout strategy and movie performance are not supported (Griffith, Yalcinkaya, & Rubera, 2014). However, it is proved that restrictive movie ratings negatively

relate to opening week box office, and that masculine culture associate positively to more restrictive ratings, because of their pursuit of risk (Leenders & Eliashberg, 2011).

### **2.5.2 Schwartz**

Hofstede's dimensions theorize the cultural influence from a national level; controversially, Schwartz focuses on the culture values at the individual level (Craig, Greene, & Douglas, 2005). Schwartz (1994) defines human values as "desirable goals, varying in importance, that serve as guiding principles in people's lives". Schwartz' values are based on the items which are "developed to measure the content of individual values recognized across cultures" (Schwartz, 1994). During 1988 and 1992, 87 teachers and students from 41 cultural groups in 38 countries received the 56 value items, and they were asked to rank each value item served as a guiding principle in their lives. Thus, this measurement takes the general cultural influence and uniquely personal experience into considerations (Schwartz, 1994). At the individual level, the set of value priorities can imply the trade-offs during the pursuing procedure to a value.

Schwartz's cultural framework has ten individual dimensions (Schwartz & Bardi, 2001):

- (1) Power: Social status and prestige, control of human resources or dominance.
- (2) Achievement: Individual success is based on the ability to demonstrate social standards.
- (3) Hedonism: Oneself own fun and emotional satisfaction.
- (4) Stimulation: Excitement, novelty, and challenge in life.
- (5) Self-direction: Independent thinking and action - selection, creation, exploration.

- (6) Universalism: Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature.
- (7) Benevolence: Preservation and enhancement of the welfare of people with whom one is in frequent personal contact.
- (8) Tradition: Respect for, commitment to, and acceptance of the customs and ideas that traditional culture or religion impose on the self.
- (9) Conformity: Restraint of actions, inclinations, impulses likely to upset or harm others and to violate social expectations or norms.
- (10) Security: Safety, harmony, and stability of society, of relationships, and of self.

Those ten individual dimensions are labelled and defined into seven culture values by Schwartz (1994): conservatism, intellectual, affective autonomy, hierarchy, mastery, egalitarian commitment and harmony.

Comparing Hofstede's and Schwartz's, the latter have some advantages (Schwartz, 1994). Firstly, it has a deeper theoretical origin. Secondly, Schwartz's dimensions include the four Hofstede's dimensions, and they have more comprehensive value sets. Thirdly, the data was collected between 1988 and 1992, which is more recent than Hofstede's, between 1967 and 1973. Fourthly, the data samples contained more diverse regions, including the socialist countries. Imm, Anne, Lee & Soutar (2007) propose a study to compare explaining power of cultural distance derived from both frameworks. Their results suggest that two frameworks' 23 inter-country cultural distances are inconsistent in their data sample. Although both cultural distances have a negative effect on the international trade, only Schwartz' cultural distance has a

significant relationship to it. Thus, the authors conclude that Schwartz's potentially more important than Hofstede's.

Nevertheless, in the field of cultural impact on movie performances, hardly any research employs the Schwartz's cultural dimensions to measure the individual cultural differences. Only Moon & Song (2015) use the text mining technic to identify how individual audience interprets the content of movies, but this study obtains the Hofstede's framework to measure the general cultural environment of each foreign market, not the individual cultural root.

To compare which cultural framework can better explain the cultural impact on the moviegoers' consumption, I will apply both cultural frameworks to compare them.

## **2.6 Cultural Distance**

Culture distance is defined as an index to measure the cultural difference in countries (Hoskins & Mirus, 1988; Hoskins, McFadyen & Finn, 1997). Expounded from the intercultural communication theories, cultural distance captures the cultural differences and similarities during the process of interchange and communication (Hofstede, 1980; Gudykunst, 1997). Generally, researchers argue that the cross-cultural adaptation and adoption between similar cultures are more accessible (Ellingsworth, 1983; Kim, 2001). Especially in movie field, academics hold the view that cultural similarities to the United States can enhance the adoption of Hollywood movies in those foreign markets (Fu & Lee, 2008; Fu & Govindaraju, 2010; Moon & Song, 2015; Moon et al., 2016).

Additionally, the Hofstede's culture framework is widely applied to measure the cultural distance (Fu & Govindaraju, 2010). Kogut and Singh (1988) carried out the first formulation to compute the cultural distance between any two countries. The four cultural dimensions (power distance, uncertainty avoidance, masculinity, and individualism) deviations between each country and the United States were combined to culture distance index:

$$Cultural\ Distance_H = \sum_{\alpha=1}^4 \frac{(I_{\alpha j} - I_{\alpha u})^2}{4V_{\alpha}}$$

where  $I_{ij}$  is the index for the  $i$  culture dimension of country  $j$ ,  $u$  stands for the United States,  $V_i$  indicates the variance of the index of the dimension  $i$  for all the countries in Hofstede's sample.

Employing this cultural distance measurement, prior studies analyze the cultural influence in the movie industry (Fu & Govindaraju, 2010; Craig, Greene, & Douglas, 2005). For example, Fu and Govindaraju (2010) use the Hollywood movie ticket receipts data of 36 countries from 2002 to 2007 to measure the worldwide moviegoers' consumption similarities. Specifically, the similarity is captured by the correlation between domestic and foreign market receipts. The results of the fixed effect model support that those countries which smaller cultural distance share more consumption similarities with the United States. Craig, Greene, & Douglas (2005) propose a study to measure the foreign market's acceptance of American movies. They collect top 50 movie data in eight foreign countries outside United State from 1997 to 2002. The results indicate that films are more likely to achieve success in countries which are culturally closer to the United States.

## **2.7 Hierarchical Structure of movie data**

International movie data are naturally nested in a multilevel data framework (Bryk & Raudenbush, 1992). Simply conducting the Ordinary Least Squares results in serve problem for only considering the single level (Akdeniz & Talay, 2014). Hierarchical linear modeling (HLM) is an advanced data analysis technique for data structured at more than one level (Raudenbush & Bryk, 2002; Tabachnick & Fidell, 2013). To illustrate how data can be organized at multiple levels, we can imagine several students (lower level of data) studying at different schools (second level) in a region (third level) and we want to know what factors contribute to their quantitative aptitude. Analyzing data without including higher level data will increase Type I error because in such analysis there will be too many degrees of freedom that will not be freed (Tabachnick & Fidell, 2013). Ideally, for data Hierarchical, the data for each level must come from the units, which should be random samples from their respective populations. Ever since researchers have realized that analyzing a hierarchical dataset at one level in isolation makes research findings less interpretable and generalizable, HLM is becoming increasingly prevalent. Nested data structures in international marketing are generally overlooked and need to apply the Hierarchical model for more in-depth exploration; meanwhile, the international film industry presents an appropriately typical hierarchical structure (Leenders & Eliashberg, 2011).

To predict movie performances in both domestic and international markets, Neelamegham & Chintagunta (1999) conduct a hierarchical Bayes model to forecast the audience at three distribution stages, specifically, the market evaluation stage, the domestic lease stage, and the international lease stage. The data set covers from January 1994 to May 1996, including 35 American movies data in 13 countries. Parameters can be classified into three

categories, country-specific intercept, country-level parameters (screens, trends, cumulative audience), movie-specific parameters (stars, genres).

The results illustrate that all those covariates influence more in domestic market (United States) than in international markets; furthermore, the screen number is the most important marketing mix among data sample. Interestingly, as for genre preference, the British Commonwealth and Italy enjoy the action movie most, and United States et al prefer the romance movies most; therefore, authors suggested that international marketing strategy should be based on “non-geographic grouping”. Together, this study outlines that the viewership of each movie is based on both movie features and market information.

Although this study proposes a model to predict the movie performance, those findings are insufficient to help us understand the underlying mechanism those phenomena. Culture could be one of the potential perspectives to consider. Craig, Greene, & Douglas (2005) propose a study to measure the foreign market’s acceptance of American movies. Based on the online resource, Variety.com, they collected top 50 movie data in eight foreign countries outside United State from 1997 to 2002. This research adopts a hierarchical linear random parameters regression model, which employs both film-level variables (domestic box office, genre) and country-level variables (cultural distance, language, the degree of Americanization). Per capita income is obtained from the World Bank (2001) as the covariate to control for the wealth as well as the individual affordability of movie, and the number of McDonald’s is used to assess the degree of Americanization. The movie genre information is collected from the IMDB and coded into 12 dummy variables. However, the commonly used variable, screen number, is ruled out, because



the authors agree that box office drives the screen numbers, not the reverse.

The results of the study indicate that films are more likely to achieve success in those countries which are culturally closer to the United States; besides, the higher degree of Americanization, the higher box office per capita; what's more, films performance better in English-speaking countries than in non-English-speaking countries. Additionally, seven genres have a significant impact on the foreign market, such as family, action, fantasy, adventure, animated, mystery and horror, but the others do not.

## **2.8 Research gap**

In the analyzation of United Stated movies performances in nine East Asian countries, Lee (2009) states that there are 212 out of 585 movies data missing in the Hong Kong market. That unavailability could attribute to two reasons: the movies are not released in Hong Kong, or the movies released but the box office data is unavailable. It is unmanageable to determine each movie, so all the missing data is ascribed to not released. Consistent to this processing method, Kim and Jensen (2014) also state that most films never have a chance to export to the foreign market, and 64% of produced movies were not cross-border during 2004-2009. As the potential systematic bias introduced by missing data, this study adopts the Heckman's two-stage technique (1979), which considers the possibility of "sample selection bias". The author only employs the Heckman's procedure for the robustness of findings, which is focusing on the decisions made by moviegoers to watch or not. However, Lee (2009) agrees that the distributors make the decision whether to release according to their understanding of the aesthetic taste of the local audience and the prediction of performances.

Generally, this study only captures the observed data but does not explore the factors which influence the Hollywood films releasing or not in each country. According to Sorenson and Waguespack (2006), the distributor plays a role of bridge between movie producers and moviegoers, because “they select the films they believe will appeal to audiences, convince theater owners to exhibit them, copy and distribute reels to the theaters, and promote films prior to and after their release”. The interaction between moviegoers and distributors, namely the demand and supply, should be taken into consideration. Elberse & Eliashberg (2003) finds by conducting simultaneous-equation model, which captures the dynamics of the behavior of moviegoers and the exhibitors.

Kim & Jensen (2014) estimate two aspects of a movie, exporting possibility and the actual success, in the foreign market by the sample of European countries from 2004 to 2009. Specifically, they analyze the relationship between two independent variables, domestic performance and the awards effect, and the two dependent variables, unobservable exporting likelihood and observable box office of foreign markets. The results of Cox proportional hazards model indicate that domestic box office and awards nomination positively influence the exporting likelihood. Cultural distance negatively moderates the relationship, but independent distributor shows a positive impact.

Although the authors already shed light on the culture impact on the unobservable distribution possibility, it ignores the Hierarchical nature of international movie industry. All in all, my study interprets the cultural influence on the Hollywood movies’ exporting likelihood while considering the Hierarchical structure of movie data.

## **Chapter 3: Hypotheses**

### **3.1 Movie-level variables**

According to the definition of Spence (1974), market signals are “activities or attributes of individuals (producers) in a market which, by design or accident, alter the beliefs of, or convey information to, other individuals (audiences) in the market”. To reduce the uncertainty and help consumers to evaluate product quality before purchasing, firms provide information towards the market (Akdeniz & Talay, 2013). That information could be introduced by price, advertising, and other forms which could contribute to consumers’ decisions (Rao et al, 1999). As Kim & Jensen (2014) claimed, the effectiveness of market signals depends upon the concern and understanding of signal-receivers. Specifically, for the relationship of market signals and unobservable quality, the effectiveness also relies upon the receivers’ understanding of quality.

#### **3.1.1 Budget**

The production budget is the signals of movie quality because producers invest according to the expectations that high quality of a movie can recoup the high investment (Akdeniz & Talay, 2013). Furthermore, production budget is a determined market signal, because the active investment in the production of low-quality movies to deceive consumers may occur backfire (Akdeniz & Talay, 2013). Moon & Song (2015) clarify that cultural products with the big budget should be culturally universal to appeal to the international market; for small-budget cultural products, being culture specific is more conducive to gain the domestic audience, although it will fail to satisfy the international consumers. Meanwhile, the individual domestic market is not enough to compensate the investment, so the big-budget movies are targeting overseas market to

gain more audience (Moon & Song, 2015). Previous studies testify that the high production budget movies have greater chance to achieve success (Elberse & Eliashberg, 2003).

Elberse & Eliashberg (2003) employ an economic simultaneous-equations model to capture the dynamics of the behavior of moviegoers and the exhibitors. They collect the data of weekly revenue and screens both in America and four foreign countries for top 25 American movies released 1999. The results show that log of production budget is significant to log opening week screen numbers in three foreign countries, France (0.39), Germany (0.38), and Spain (0.24), and United Kingdom (0.35). Besides, the log screen number is highly significant to the log opening week revenue, France (1.43), Germany (1.51), and Spain (1.89), and United Kingdom (1.51). It implies that the budget directly impacts the supply side, screens, and then indirectly impact the movie revenue.

This study finds the budget directly influence the supply side, not the audience behaviors. Although this study ignores the cultural effect on the opening box office, it still emphasizes the difference between supply side and demand side. In my study, I will also take the budget as an important market signal to distributors and audiences.

### **3.1.2 Genre**

Genre reflects a standard or revelation of the system, through which the audience predict their satisfaction and the producers assess the sales prospects (Miller, Govil, Maxwell, & McMurria, 2005). Media studies have underlined the genre concentration of producers' production and audience' reception (Fu, 2013). Austin and Gordon (1987) also find that the

moviegoers have distinguished genre preferences, and that genre is the most significant factor influencing their decisions to attend a movie or not. Beyond movies, Cohen (2002) finds that the TV program viewers display genre loyalty. The genre is not only the expression of different tastes in cultural consumption but also the characterization of audience's content preferences (Fu, 2013).

Attempting to predict movie performances in both domestic and international markets, Neelamegham & Chintagunta (1999) conduct a hierarchical Bayes model to forecast the audience at three distribution stages, specifically, the market evaluation stage, the domestic lease stage, and the international lease stage. The data set covers from January 1994 to May 1996, including 35 American movies data in 13 countries. Parameters can be classified into three categories, country-specific intercept, country-level parameters (screens, trends, the cumulative audience), movie-specific parameters (stars, genres).

The results illustrate that all those covariates influence more in the domestic market (United States) than in international markets. Interestingly, as for genre preference, the British Commonwealth and Italy enjoy the action movie most, and United States et al prefer the romance movies most. Therefore, authors suggested that international marketing strategy should be based on “non-geographic grouping”.

Taken together, this study outlines that the viewership of each movie is based on both movie features and market information. This study proposes a model to predict the movie performance, but those findings are insufficient to help us understand the undergoing mechanism

those phenomena. Culture could be one of the potential perspectives to consider.

Considering the cultural influence on the Hollywood movies' performance in the foreign market, Craig, Greene, & Douglas (2005) analyze the impact of genre on box office performance. For 12 genres, seven (family, action, fantasy, adventure, animated, mystery and horror) of them have significant coefficients to total revenue, ranging from -.287 to .685. For country groups, 9 out of 12 genres have a significant influence on German-speaking group. For English-speaking group and Spanish-speaking group, both have four genres showing significant coefficients, and only one of them is identical.

Though the results are inconsistent with the previous results of Neelamegham and Chintagunta (1999), both reflect the pattern that certain movie genre displays diverse significance in the international market. Those studies only focus on the actual performance, but distributor select the movies to release based on their understanding of audiences' taste. Following that, my study will include genre variables in movie-level in both distributors' selection and moviegoers' decisions.

### **3.1.3 Critical reviews**

The Internet provides an easy way to share information with others, and online websites allow opinions exchange (Liu, 2006). From the perspective of the market signal, consumer regard early success as a guarantee of quality, especially those positive feedbacks commented by professional early adopters (Moon et al., 2010). Professional commentators usually provide comments and ratings, through which consumers are indicated to unobservable product quality

and ability to make a good choice (Kirmani & Rao, 2000). Reinstein & Snyder (2005) state that the high ratings of both critics and moviegoers increase the total revenues. Eliashberg and Shugan (1997) claim that critical reviews not associate with early box office but with the late and accumulative box office; therefore, they argue that critics are predictors of movie performance but not the influencers. However, Boatwright et al. (2007) argue that critical reviews are both predictors and influencers because the positive WOM generated from early high ratings can extend to ordinary audiences.

Moon et al. (2010) investigate how the professional critics' ratings influence movie revenue. They collect weekly data of 246 movies released between 2003 and 2005 both in theaters and on videos. The regressions results imply that early high revenue increases the movie ratings. In turn, the high ratings will generate high advertising investment, and eventually, will increase the box office revenue. Moon & Song (2015) find that the critic ratings have a significant impact on both domestic and foreign market, while the audience reviews display neither of two markets.

In summary, professional critic reviews have a significant influence on both domestic and foreign markets, and this influence works on both distributors' marketing and moviegoers' consumptions. The previous research only focuses on the actual box office, which is the audience side. However, the distributors act on their understandings and predictions of the movie, and their releases decide the available movies to moviegoers. In my study, I will not only take the critical reviews as the predictors in the audience side but also include it in the distributors' selection procedure.

### **3.1.4 Rollout strategy**

Experience products, such as movies, usually have a short life cycle and decline rapidly in revenue after the introduction (Elberse & Eliashberg, 2003). Meanwhile, the more communication of international market results in a competitive environment where the decisions of products rollout strategy are increasingly significant (Yalcinkaya et al., 2007). Previous research has addressed the topic of simultaneous introduction and sequential introduction (Harvey & Griffith, 2007; Stremersch & Tellis, 2004). Simultaneous introduction allows a firm to achieve the “first-mover” benefit, but it increases the coordination difficulties and total cost (Chrysochoidis & Wong, 1998). Sequential introduction offer opportunities to modify the products during the introduction progress, but it may reduce the total revenue because of the competitive products, piracy and gray market (Stremersch & Tellis, 2004).

Focusing on the relationship between rollout strategies and product performance, Griffith, Yalcinkaya, & Rubera (2014) examined from the perspectives of national economic wealth and culture elements. Specifically, the rollout strategy refers to two measurable indexes, the time duration between the leading country, and the target country and the number of countries before introducing to the target country. They employ the GDP as the indicator of economic wealth and the Hofstede’s four dimensions (individualism, power distance, masculinity and uncertainty avoidance) as the indicators of national culture. Besides those major variables, control variables are also included, such as star, studio influence, directors’ influence, sequel or not, budget, opening week number of theaters and sales previous countries From Box Office Mojo, The Numbers and IMDb, 259 movies from 16 countries released in the United States in 2006 and



2007 are employed in a step-wise Hierarchical model. This model is specified into two levels, movie level and country level.

The results show that the final cross level multilevel model explains 29.6% of total country-level performance variance. The predictors contribute to explain 72.1% of the variance across countries and 29.4% of the variance across movies. For the negative relationship between the time lag and country-level performance, economic wealth and degree of power distance all have a positive moderating effect, but the degree of individualism and degree of uncertainty avoidance have a negative moderating effect. For the positive relationship of the number of countries before introducing to the target country and country-level performance, individualism and power distance have a negative moderating effect, but the economic wealth and uncertainty avoidance have a positive moderating effect. Moon et al. (2016) also include the variable “Release day difference” to measure the number of days between the release of the U.S. and the foreign country. They also find this variable has a significantly negative effect (-.005) on foreign box office.

In line with previous research, my study hypothesis that the time lag is negatively related to actual attendance.

*Hypothesis 1: The time lag of movie release between domestic market and foreign market negatively impact the box office performance.*

### **3.1.5 Movie control variables**

#### **3.1.5.1 Sequel**

Regarding the parent movie as a brand, its sequels can be treated as the brand extension (Sood & Drèze, 2006). Previous studies have addressed the influence of sequels on the movie performances (Hennig-Thurau et al, 2009; Dhar, Sun, & Weinberg, 2012). Following them, I will include the dummy variable sequel (=1) or not (=0) in my model.

#### **3.1.5.2 MPAA rating**

The Motion Picture American Association give ratings to the content of movies: G (general audiences), PG (parental guidance suggested), PG-13 (possibly unsuitable for children younger than 13 years of age), R (children not admitted unless accompanied by an adult), NC-17 (no one under 17 admitted), and NR (not rated). It may have considerable influence on the availability of different age groups and the attendance of the movie. Following Dhar et al. (2012), I will classify the MPAA into dummy variables (1) G or PG, (2) PG-13, and (3) R. Taking PG-13 as the 0, G or PG is coded as -1, and R is coded as 1.

### **3.2 Country-level variables**

#### **3.2.1 Cultural distance**

Movies present the culture in which they are produced and fashioned; furthermore, when other factors are equal, consumers initially prefer products crafted from domestic and familiar cultures (Fu& Lee, 2008). This cultural proximity enhances the international media trade in those countries that share same languages, interrelated histories and overlapping cultural features (Falkenheim, 2000). Prior research has employed Hofstede's cultural framework to provide a

strong theoretical basis for the diffusion of national cultural differences and the introduction of new products (Dwyer, Mesak & Hsu, 2005; Chandrasekaran & Tellis, 2008).

In international movie industry, many studies have applied the cultural distance that is calculated from the Hofstede cultural index by the Kogut and Singh (1988) formulas (Fu, 2008; Fu, 2012; Akdeniz & Talay, 2013; Xu & Fu, 2014; Moon & Song, 2015; Moon et al., 2016). For example, Xu & Fu (2014) operates the Hollywood movies 2003-2007 data in 73 countries to analyze the aggregate bandwagon effect in consumers' choice. They find that the higher cultural distance index, the more uncertainty of the moviegoers feel about the Hollywood movie. Thus, those consumers will depend more on earlier adopters' choices and information, so the box office revenue distribution pattern is more concentrated in those countries. Fu (2012) also finds that one measurement unit increase in cultural distance, 7% market share decrease of Hollywood in a foreign country; one measurement unit increase in cultural distance, 10% genre taste dissimilarity between the United States and foreign market increase from the sample mean. Other studies also find cultural distance have a negative effect on international success (Craig et al., 2005; Lee, 2006; Fu & Govindaraju, 2010).

Kim & Jensen (2014) estimate two aspects of a movie, exporting possibility and the actual success. They conduct Cox proportional hazards model to allow both movie factors and market country factors in the estimation of export likelihood of a movie. The results of this study indicate that domestic box office positively relates to the exporting likelihood, and cultural distance negatively moderates the relationship. However, expectation on negative main effect from cultural distance is not supported. The European countries exclusive data set and the

estimation method could be potential reasons. Following previous studies' finding on negative effect of cultural distance on movie performance, I hypothesize the cultural distance has the similar negative effect on export likelihood of a movie.

*Hypothesis 2: The exporting likelihood of Hollywood movies will be bigger in those countries that have similar culture.*

As Craig, Greene, & Douglas (2005) summarize, Hofstede's dimensions theorize the cultural influence from a national level; controversially, Schwartz focuses on the culture values at the individual level. When distributors decide on the releasing of a movie, the target market is a specific country, thus the decision is based on the cultural understanding of a country. However, moviegoers are not only influenced by the national culture but also their personal experience. For Hofstede's and Schwartz's cultural framework, they can be applied to measure the cultural distance in the distribution and consumption respectively.

*Hypothesis 3: Hofstede framework can better predict the export likelihood, while the Schwartz can better predict the actual box office performance.*

### **3.2.2 English proficiency**

As a keystone in the culture concept, language promotes the cultural proximity by the language proximity (La Pastina & Straubhaar, 2005). Therefore, language closeness of foreign movies can stimulate the acceptance of consumers (Fu, 2012). Wildman (1994) states that if all other factors are constant, audience like the production of movies and programs in native

language. Although foreign language works can be translated into subtitles, something will always be lost during the translation (Wildman, 1994). Fu (2012) also claims that understanding the conversations in a movie is essential for moviegoers to enjoy it, and the subtitles and dubbing can only ease but not eliminate any existential language frictions.

Fu (2012) examines the differences between Hollywood genre preference between foreign countries and the United States. He employs the box office revenue data of 25 countries from 2002 to 2007, and transfer the revenue into attendance by the average admission price. For the measurement of dissimilarity of genres taste, the author conducts the Euclidean distance between the genre share vectors of two countries. To measure the English proficiency, Fu (2012) employs the average score of TOEFL listening test, which is also applied by Man et al (2004). Because TOEFL is a systematic and consistent standard test, it captures the general English-speaking environments of a country. In this study, I will adopt the average TOEFL score as the indicator of English proficiency.

The results of fixed effect model indicate that English proficiency is significantly related to both taste dissimilarity and Hollywood market share, while the cultural distance is only significantly related to the genre taste dissimilarities. Despite the collinearity of those two variables, both have significant explaining power. The author concludes that English proficiency is more comprehensive than cultural distance in describing the Hollywood movies performance in the foreign market. Based on Fu's study, I will apply the HLM model to specify movie-level variables and country-level variables, in which both English proficiency and cultural distance will be included.

*Hypothesis 4a: The higher English proficiency of a country, the higher exporting likelihood towards the same Hollywood movie.*

*Hypothesis 4b: The higher English proficiency of a country, the better box office performance towards the same Hollywood movie.*

### **3.2.3 Economic wealth**

Economic wealth has long been considered as a key factor in the acceptance of new product (Chandrasekaran & Tellis 2008). Economic factors, such as gross domestic product (GDP), contribute to explain the competition and exporting ability of a country's media industry (Waterman & Jayakar, 2000). On the one hand, Tellis et al (2003) argue that only cultural factors are significant in explaining the variance of new product sales in the global market, but not the economic factors. On the other hand, Van et al. (2009) announce that only economic factors matter, but not the cultural factors. However, Chandrasekaran & Tellis (2008) prove that both economic and cultural factors impact the global performance of new products. Griffith et al. (2008) also agree that consumers' preferences are driven by both economic conditions and cultural interaction.

Griffith, Yalcinkaya, & Rubera (2014) examine the influence of rollout strategy on the movie performance, from the perspectives of national economic wealth and culture elements. They employ the GDP as the indicator of economic wealth. The multilevel results indicate that the time duration between the leading country and the target country negatively relates to the box office performance, and GDP positively moderate this relationship. Besides, the number of

countries before introducing to the target country is positively related to box office revenue, and GDP positively moderates this relationship.

Moon et al. (2016) identify a more comprehensive perspective to understand the cultural and economic influence on movie performance in the foreign market, by adding the cultural compatibility in the framework. GDP per capita is applied in the model to obtain the economic wealth. The results of this study indicate that both low and high GDP per capita display less preference for the global movies, but the medium GDP consume more. Although those results are distinctive from previous research, it also supports the argument that economic wealth has an impact on audiences' movie preferences and consumptions.

Per capita GDP can only show the overall output value of a country's economy, but not directly as a standard of living for ordinary people. According to the definition of Cassel (1918), Purchasing Power Parity is that currencies of different countries should have the same purchasing power. It means that “the exchange rate between two countries should equal the ratio of the two countries' price level of a fixed basket of goods and services” under the assumption that there are no transaction cost and trade barriers (Samuelson,1964). GDP is widely used to measure the aggregate national wealth, but it is unable to rule out the impact of different price levels across countries; therefore, “conversion factors based on purchasing power parities (PPPs) should be used to convert data in national currencies into a common numeraire currency” (Gulde & Schulze, 1992). Commonly, Purchasing Power Parity is measured by the Big Mac Index, which is popularized by The Economics. This index compares the different prices of

Macdonald's Big Mac hamburger across different countries. In this study, the Big Mac index will be employed to grasp the diverse levels of economic wealth.

*Hypothesis 5: Box office performance is better in those countries with higher purchasing power parity.*

### **3.2.4 Production**

Lee (2009) explains the decline of popularity of Hollywood comedies in Hong Kong as the result of the strong competition by local movie production. Meanwhile, Neelamegham & Chintagunta (1999) indicate that managers need to do pre-launch to assess the potential competition from the foreign market. Thus, local market movie production is an essential factor to influence the distributor to decide the releasing. In this study, the production number of each country is included in the distribution stage, and the distribution is directly influencing the availability of audience.



## Chapter 4: Methodology

### 4.1 Data

This study collects the data of 769 wide release Hollywood movies between 2012 and 2016. According to the Box Office Mojo.com (2017), the wide release movies refer to “those movies released in 600 or more theaters and their total grosses, grouped by wide release date”. Comparing to the whole dataset, the limited release movies are ruled out. Those movies are usually small budget or independent, and the data is unavailable or uncomplete. Meanwhile, the wide release ensures the movies are not only released in United States but also released subsequently in foreign markets (Elberse & Eliashberg 2003; Neelamegham & Chintagunta 1999). To contain as much cultural variance as possible, I first collected all foreign markets data and then deleted those countries, which have rarely little releasing. Finally, 769 movies’ releasing dates and box office performance in 56 foreign countries, in which China is excluded because of the strict import quotas on movies. The Table 1 displays the box office and number of movie comparisons between the all the released Hollywood movies and wide release movies. It indicates that the wide release movies at least contribute to more than 95% of the yearly box office revenue. Therefore, the wide release movies cover most box office revenue and exclude those movies without much box office.

Table 1: Box office and number of movie comparisons between all Hollywood movies and wide release Hollywood movies

	All Hollywood movies		Wide release Hollywood movies	
	Box office (millions)	Number of movies	Box office (millions)	Number of movies
2012	11.960	668	10.684 (97.5%)	148 (22.2%)
2013	10.956	689	10.639 (97.1%)	147 (21.3%)
2014	10.436	706	9.962(95.5%)	152 (21.5%)
2015	11.099	705	11.056 (99.6%)	158 (22.4%)
2016	11.372	736	11.021 (96.6%)	165 (22.4%)

Movie-level data was collected from the Box Office Mojo and Internet Movie Database (IMDb). Specifically, some movies belong to multi genres, and the first genre displayed on Box Office Mojo was selected. Country-level data was collected from the Organization for Economic Co-operation and Development, TOEFL, Hofstede, Schwartz, World Meters, and The Numbers.

#### 4.2 Cultural distance measurement

Although Hofstede cultural framework is widely applied, it only captures the culture difference between producing countries and consuming countries in a general way, ignoring individual consumer's decision (Moon et al., 2016). Following the previous study of comparing two cultural frameworks (Imm, Anne Lee & Soutar, 2007). This study applies both Hofstede's and Schwartz' cultural distances.

Some of the scholars regard the GLOBE approach as the most comprehensive work on the culture distance measurement, which contains nine dimensions to calculate:

$$Cultural\ Distance_G = \sum_{j=1}^9 \frac{(H_{Aj} - H_{Tj})^2}{9V_j}$$

where the  $H_{Aj}$  is the score of dimension j for acquiring country;  $H_{Tj}$  is the score of dimension j for target country;  $V_j$  is the variance of the score of dimension j. López-Duarte & Vidal-Suárez (2013) adopted the Schwartz's, GLOBE's and the Hofstede's to analyze the effect of culture distance on the choice between the joint ventures and the wholly-owned subsidiaries. Following this logic, the Schwartz's cultural distance is calculated by the following formula:

$$Cultural\ Distance_S = \sum_{\alpha=1}^7 \frac{(I_{\alpha j} - I_{iu})^2}{7V_{\alpha}}$$

### 4.3 Model and Estimation Methods

This study conducts Heckman's two-step selection model. In the first selection step, the dependent variable for Probit model is whether  $movie_i$  is released in  $country_j$ . For each  $movie_i$ , if it is released in  $country_j$ , the dummy variable equals to 1, otherwise, it is 0. The independent variables include both movie-level factors (budget, genre, critical ratings, MPAA ratings, and sequel) and country-level factors (cultural distance from USA, average TOEFL score, number of movie productions, population and the Purchasing Power Parity index).

Following Bryk & Raudenbush's (1992) statement that international movie data are naturally nested in a multilevel framework, this study employs the Hierarchical mixed effect model, which centers the movie level variables in country level. The model of step 1 is specified as follows:

*Step 1: Selection-Exporting likelihood*

$$\text{Exporting likelihood}_{ij}(Y = 1) = \pi(x) = \Phi[f(x)]$$

where the  $\Phi(\cdot)$  is the cumulative density function of standard normal distribution.

*Level 1: movie*

$$f(x) = \alpha_{0j} + \sum_{n=1}^{14} \beta_{nj} \text{Genre}_n + \alpha_{1j} \log(\text{Budget}) + \alpha_{2j} \log(\text{Metascore}) + \alpha_{3j} \text{MPAA} + \alpha_{4j} \text{Sequel} + \alpha_{5j} \text{Year} + \epsilon_{ij}$$

*Level 2: country*

$$\begin{aligned} \alpha_{0j} &= \alpha_{00} + \alpha_{01} \log(\text{PPP}) + \alpha_{02} \log(\text{TOEFL}) + \alpha_{03} \log(\text{Cultural distance}) \\ &\quad + \alpha_{04} \log(\text{Population}) + \alpha_{05} \log(\text{Production}) + \epsilon_{0j} \\ \beta_{nj} &= \beta_{n0} + \beta_{n1} \alpha_{01} \log(\text{PPP}) + \beta_{n2} \log(\text{TOEFL}) + \beta_{n3} \log(\text{Cultural distance}) + \epsilon_{1j} \end{aligned}$$

$$\begin{aligned}\alpha_{1j} &= \gamma_{10} + \gamma_{11}\log(PPP) + \gamma_{12}\log(TOEFL) + \gamma_{13}\log(Cultural\ distance) + \varepsilon_{2j} \\ \alpha_{2j} &= \gamma_{20} + \gamma_{21}\log(PPP) + \gamma_{22}\log(TOEFL) + \gamma_{23}\log(Cultural\ distance) + \varepsilon_{3j} \\ \alpha_{3j} &= \gamma_{30} + \gamma_{31}\log(PPP) + \gamma_{32}\log(TOEFL) + \gamma_{33}\log(Cultural\ distance) + \varepsilon_{4j} \\ \alpha_{5j} &= \gamma_{40} + \gamma_{41}\log(PPP) + \gamma_{42}\log(TOEFL) + \gamma_{43}\log(Cultural\ distance) + \varepsilon_{5j}\end{aligned}$$

$$Cultural\ Distance_{e_H} = \sum_{\alpha=1}^4 \frac{(I_{\alpha j} - I_{\alpha u})^2}{4V_{\alpha}}$$

$$Cultural\ Distance_{e_S} = \sum_{\alpha=1}^{10} \frac{(I_{\alpha j} - I_{\alpha u})^2}{7V_{\alpha}}$$

Compare to step 1, movie-level factors (budget, genre, critical ratings, MPAA ratings, and sequel) and country-level factors (cultural distance from USA, average TOEFL score and the Purchasing Power Parity index) are the same. The day differences of  $movie_i$  release between USA and  $country_j$  is included in movie level. Furthermore, number of production in each country (*Production*) is excluded in step 2, because this variable is regarded as the exclusion restriction, which only affects the selection but not the consumption. Besides, the inverse Mills Ratio generated from step 1 will also become an additional variable in movie level.

Previous studies have adopted the country-level box office revenue as the dependent variables (Moon et al., 2016; Lee, 2006; Kim & Jensen, 2014; Fu & Govindaraju, 2010; Lee, 2009; Lee, 2008), and some of them process box office in a more comprehensive way, such as log of per capita box office revenue (Craig et al, 2005), standardized movie sales by population (Griffith et al., 2014). Some studies employ the attendance as the dependent variable (Yamamura, 2008; Dhra, 2012; Fu, 2012). In my study, I obtain log of per capita box office

revenue for below reasons: (1) all the foreign country's revenue data from Box office mojo.com is generated in US dollars; (2) the log per capita revenue will not fluctuate widely under the influence of population variance and extreme value variance.

*Step 2: Movie performance*

*Level 1: movie*

$$\log(\text{Box office per capita}) = \theta_{0j} + \sum_{n=1}^{14} \mu_{nj} \text{Genre}_n + \theta_{1j} \log(\text{Budget}) + \theta_{2j} \log(\text{Metascore}) + \theta_{3j} \text{MPAA} + \theta_{4j} \text{Sequel} + \theta_{5j} \log(\text{Timelag}) + \theta_{6j} \log(\text{Timelag})^2 + \theta_{7j} \text{MillsRatio} + \varphi_{ij}$$

*Level 2: country*

$$\begin{aligned} \theta_{0j} &= \rho_{00} + \rho_{01} \log(\text{Cultural distance}) + \rho_{02} \log(\text{TOEFL}) + \rho_{03} \log(\text{PPP}) + \omega_{0j} \\ \mu_{nj} &= \mu_{00} + \mu_{01} \log(\text{Cultural distance}) + \mu_{02} \log(\text{TOEFL}) + \mu_{03} \log(\text{PPP}) + \omega_{1j} \\ \theta_{1j} &= \rho_{10} + \rho_{11} \log(\text{Cultural distance}) + \rho_{12} \log(\text{TOEFL}) + \rho_{13} \log(\text{PPP}) + \omega_{2j} \\ \theta_{2j} &= \rho_{20} + \rho_{21} \log(\text{Cultural distance}) + \rho_{22} \log(\text{TOEFL}) + \rho_{23} \log(\text{PPP}) + \omega_{3j} \\ \theta_{3j} &= \rho_{30} + \rho_{31} \log(\text{Cultural distance}) + \rho_{32} \log(\text{TOEFL}) + \rho_{33} \log(\text{PPP}) + \omega_{4j} \\ \theta_{4j} &= \rho_{40} + \rho_{41} \log(\text{Cultural distance}) + \rho_{42} \log(\text{TOEFL}) + \rho_{43} \log(\text{PPP}) + \omega_{5j} \\ \theta_{5j} &= \rho_{50} + \rho_{51} \log(\text{Cultural distance}) + \rho_{52} \log(\text{TOEFL}) + \rho_{53} \log(\text{PPP}) + \omega_{6j} \\ \theta_{6j} &= \rho_{60} + \rho_{61} \log(\text{Cultural distance}) + \rho_{62} \log(\text{TOEFL}) + \rho_{63} \log(\text{PPP}) + \omega_{7j} \\ \theta_{7j} &= \rho_{70} + \rho_{71} \log(\text{Cultural distance}) + \rho_{72} \log(\text{TOEFL}) + \rho_{73} \log(\text{PPP}) + \omega_{8j} \end{aligned}$$

$$\text{Cultural Distance}_H = \sum_{\alpha=1}^4 \frac{(I_{\alpha j} - I_{iu})^2}{4V_{\alpha}}$$

$$\text{Cultural Distance}_S = \sum_{\alpha=1}^{10} \frac{(I_{\alpha j} - I_{\alpha u})^2}{7V_{\alpha}}$$

## Chapter 5: Results

Descriptive statistics of 769 wide release movies and 56 countries are as Table 1. The production year of those wide-released movies is the control variable, and the percentage of each year is list in the part of standard error. For five movie-level variables, *Genre*, *Metascore*, *MPAA ratings* and *Sequel*, the standard error also list the percentage of each category. For movie budget, mean and standard error all in million. For five country-level variables, purchasing power parity of each country is in American dollar, and the population of each country is in million. The stand error is much larger than the mean, indicating the large variance of this variable among our data. Cultural distance is calculated by the equation of Kogut and Singh (1988) with four Hofstede's cultural dimensions. Production is the number of movie produced by each foreign country in each year. The standard error is larger than the mean, thus there is large variance of production number in those countries.

Table 2: Descriptive statistics for movie-level and country-level variables in Heckman first step

Variables	Measure	Mean	Standard Error	Source
Year	Wide-released movie production year	2012-148 movies	19.25%	BoxOfficeMojo.com
		2013-147 movies	19.1%	
		2014-152 movies	19.8%	
		2015-158 movies	20.5%	
		2016-164 movies	21.3%	
<i>Movie-level variables</i>				
Genre	Movie genres	Action:160	20.8%	BoxOfficeMojo.com
		Comedy:154	20.0%	
		Drama:136	17.7%	
		Animation:62	8.1%	
		Horror:57	7.4%	
		Thriller:49	6.4%	
Budget	Production budget of each movie	60.84 million	57.371 million	BoxOfficeMojo.com
Metascore	Movie rating scores by critics	53.01(out of 100)	18.066	IMDb
MPAA ratings	Motion Picture Association America's rating system on the suitability for certain audience	G:11	1.4%	BoxOfficeMojo.com
		PG:121	15.7%	
		PG-13:331	43.0%	
Sequel	Sequel=1; Non-sequel=0	R:306 movies	39.8%	IMDb
		Sequel:134 Non-sequel:635	17.4% 82.6%	
<i>Country-level variables</i>				
PPP	Purchasing power parity for each country	275.293	1140.695	OECD.org
TOEFL	Average TOEFL test score for each country	89.64	6.125	www.ets.org/s/toefl
CD	Cultural distance from each country to United States calculated by the formula of Kogut and Singh (1988)	13.16	2.757	Hofstede: geert-hofstede.com/ Schwartz: www. Research gate
Population	Total population of each country for 2012-2016	67.27million	174.024million	worldometers.info.com
Production	Total movie production number of each country for 2012-2016	33	34.496	the-numbers.com

Correlation among all the numeric variables are calculated by the R package “corrplot” (Wei & Simko, 2016). Of all the correlation between 9 variables, the highest correlation in between the *CD* and *Production*, which is -0.315. Follow Cohen’s rules of thumb, in the psychology tradition, correlation 0.1 should be considered as small association, 0.3 might be considered as medium, and 0.5 or higher could be considered as large (Chapman & Feit, 2015). In my data, there is only one correlation beyond 0.3(*CD & Production*), and nine between 0.1 and 0.3 (*Metascore & BO*, *Budget & BO*, *Budget & Timelag*, *TOEFL & CD*, *TOEFL & PPP*, *Population & Production*, *Population & CD*, *Production & CD*, *Production & BO*, *CD & BO*). All the correlations between independent variables are lower than 0.5, suggesting that multicollinearity is not a concern.

Table 3: Correlation plot between numeric variables

	Metascore	Budget	TOEFL	PPP	Population	Production	CD	BO	Timelag
Metascore	1.000								
Budget	0.100	1.000							
TOEFL	0.006	-0.026	1.000						
PPP	0.010	0.028	-0.210	1.000					
Population	0.003	0.038	-0.106	0.098	1.000				
Production	0.015	-0.005	0.050	-0.074	0.265	1.000			
CD	0.004	0.027	-0.182	0.069	-0.158	-0.315	1.000		
BO	0.103	0.298	-0.049	-0.020	0.094	0.286	-0.119	1.000	
Timelag	-0.075	-0.122	-0.036	-0.020	-0.015	-0.025	-0.011	-0.051	1.000

To test the possible multicollinearity, I conducted the R package “car” (Fox et al., 2017). Usually, variance inflation factor (VIF) is used to detect the multicollinearity among independent variables, but R gives generalized variance inflation factor (GVIF). Compare to VIF, GVIF contains degree of freedom of each individual predictor ( $GVIF = VIF^{\left(\frac{1}{2Df}\right)}$ ). When the degree of freedom is 1, the VIF and GVIF can be used equally; however, when degree of freedom is more than 1, VIF is dubious (Fox & Weisberg, 2011). In my dataset, there are dummy variables have



more than one degree of freedom, such as *Year*, *Genre* and *mpaa*. To apply rule of thumb for VIF, comparing square of  $GVIF^{(\frac{1}{2D_f})}$  with 10. As the table below, all the values are less than 2. Therefore, it confirms that multicollinearity did not influence the model results.

Table 4: Multicollinearity among independent variables by GVIF

	GVIF	$D_f$	$GVIF^{(\frac{1}{2D_f})}$	$GVIF^{2(\frac{1}{2D_f})}$
factor(Year)	1.568	4	1.058	1.119
factor(Genre)	7.249	14	1.073	1.152
log(Budget)	1.740	1	1.319	1.740
log(Metascore)	1.188	1	1.090	1.188
mpaa	3.361	3	1.224	1.498
Sequel	1.121	1	1.059	1.121
log(PPP)	1.260	1	1.123	1.260
log(TOEFL)	1.656	1	1.287	1.656
log(CD)	1.327	1	1.152	1.327
log(Population)	1.797	1	1.341	1.797
log(Production)	1.768	1	1.330	1.768

$D_f$  is the degree of freedom of the variables

The table below displays the descriptive statistics for Heckman step 2. Different from the descriptive statistics for movie and countries individually in Heckman step 1, this is for the observations for every movie in each country after selection. Compare to the descriptive statistics, there are some differences. Firstly, action movies are released more in foreign markets while comedy and drama are released less. Secondly, the average movie budget in foreign market is higher than the average budget of all the wide-release movies. Thirdly, average cultural distance of all observations is lower than the average cultural distance of 56 countries. Fourthly, two new movie-country combined variables, *Timelag* and *Inverse Mills ratio*, are added.

Table 5: Descriptive statistics for Heckman second step model

Variables	Measure	Mean	Standard Error	Source
Year	Wide-released movie production year	2012-148 movies	19.25%	BoxOfficeMojo.com
		2013-147 movies	19.1%	
		2014-152 movies	19.8%	
		2015-158 movies	20.5%	
		2016-164 movies	21.3%	
<i>Movie-level variables</i>				
Genre	Movie genres	Action:5634	27.7%	BoxOfficeMojo.com
		Comedy:3226	15.8%	
		Drama:2556	12.6%	
		Animation:2054	10.1%	
		Horror:1403	6.9%	
		Sci-Fi:1575	7.7%	
		Other:3927	19.3%	
Budget	Production budget of each movie	71.16 million	59.83	BoxOfficeMojo.com
Metascore	Movie rating scores by critics	54.2(out of 100)	17.33	IMDb
MPAA ratings	Motion Picture Association America's rating system on the suitability for certain audience	Sequel=1;	G:95	0.5%
		Non-sequel=0	PG:3479	17.1%
			PG-13:9584	47.0%
Sequel	Sequel=1; Non-sequel=0	Sequel:4492 Non-sequel:16895	22.05% 77.95%	IMDb
<i>Country-level variables</i>				
PPP	Purchasing power parity for each country	146.541	671.78	OECD.org
TOEFL	Average TOEFL test score for each country	89.72	6.080	www.ets.org/s/toefl
CD	Cultural distance from each country to United States calculated by the formula of Kogut and Singh (1988)	2.094	0.684	Hofstede: geert-hofstede.com Schwartz: Research gate.com
Population	Total population of each country for 2012-2016	49.72 million	118.29million	worldometers.info.com
<i>Movie-Country combination</i>				
Time lag	Day difference between released country and United States	25.86	0.846	BoxOfficeMojo.com
MillsRatio	Inverse Mills Ratio calculated in the first step	0.478	0.225	Heckman first step

To estimate the model, I used the R with package “lme4” (Bates et al., 2014), which is for analyzation of linear mixed effect model. To allow for the incremental model testing, I adopted the step-wise model building approach, null model with only intercept, adding the movie-level variables, country-level variables, and random effect variables gradually. All models’ estimation is processed by maximum likelihood. All coefficients of variables are not standardized, because of variance division across levels in HLM (Griffith, Yalcinkaya, & Rubera, 2014). Also, all the t values and p values are calculated by robustness standard error.

For the Heckman step 1, I started with the unconditional model with only random intercept. The fixed intercept is 0.729 ( $p < 0.01$ ), The variance of random intercept 0.057 is the variance between countries in movies’ exporting likelihood, and the variance of residual 0.189 is the variability left unexplained. By subdividing the variance of intercept by the sum of variance of intercept and residual ( $0.057 / (0.057 + 0.189)$ ), it implies that 23.2% of the variance in exporting likelihood is due to the country-level factors.

Based on the unconditional model, I added five movie-level variables, *genre*, *Budget*, *Metascore*, *MPAA ratings* and *sequel*. Because the unconditional model and the movie variables model have different number of observations, the model fit is compared by the conditional r square calculated by the R package “MuMIn” (Bartoń, 2014). The conditional r square is 0.20 for the former model and 0.52 for the latter, suggesting that additional movie level variables help to explain more data variance. Furthermore, all the added variables have significant coefficients. Similar to the treatment to random intercept and residual for unconditional model, country account for 22% ( $0.045 / (0.045 + 0.151)$ ) of the variance. Movie genre are classified as 13 dummy

variables, in which action is coded as baseline. Compare to action, adventure, animation, crime, documentary, drama, fantasy, sci-fi, horror and romance have positive effect on exporting likelihood, but biography, comedy and family have negative effect. Movie budget and Metascore are both positively related to the exporting likelihood. MPAA classifies movies into four categories, G, PG, PG-13, and R, where G is coded as 0 in my model, and all PG, PG-13 and R have bigger chance to export in foreign markets. In the same vein, sequel movies are more likely to be exported comparing to non-sequel movies.

In country variables model, I added country-level factors, average TOEFL score, cultural distance from United States, purchasing power parity, population and the number of movie production. The conditional r square is 0.52, stating this model explains 52% of the data variance, and country-level accounts for 25% of the variance explained. Except for insignificant genre crime coefficient, all the movie-level variables are consistent with the movie-level variables model. Purchasing power parity, average TOEFL score and population negatively influence the exporting likelihood, but the cultural distance has insignificant effect.

Following model with both movie-level and country-level variables as fixed effect, I added the random coefficients with three country-level variables, cultural distance, average TOEFL score and purchasing power parity. With same observation number, country variables model's AIC is 27400, and the random effect model's AIC is 26590, implying the latter model fits better. The Chi square difference test between two models indicates that the difference is 1996 and significant, so the random coefficient model with more freely estimated parameters significantly improves the model fit. However, the interclass correlation only applies to the

random-intercept-only model, thus the ICC for random slope model is not included here. Except that the genre romance is insignificant, all movie factors show parallelism with the findings of country variables model. Country-level factors all display significant influence on exporting likelihood; log of purchasing power parity ( $\beta = 8.897, p < 0.05$ ) has positive effect, while log of average TOEFL score ( $\beta = -134.943, p < 0.01$ ), log of cultural distance ( $\beta = -58.482, p < 0.01$ ), log of population ( $\beta = -24.075, p < 0.01$ ) and log of movie production number ( $\beta = -0.098, p < 0.1$ ) have negative effects.

For those coefficients, they mean the z score of the probability of movie release in foreign market changed by the 1% of the variable changed. For example, the coefficient of log of purchasing power parity is 8.897, implying that 1% increase in the log of purchasing power parity will raise the z score of probability of releasing a movie ( $Y=1$ ) by 8.897. Transferring into margin effect of those variables can help understand each factor's influence on releasing probability. Compare to action movie, animation movies have 14% more probability to release in a country, but biography movies have 11% less probability to release. For cultural distance, one unit increases, the probability will decrease by 21.8%, and TOEFL score goes up by one unit, the probability of releasing in a country will rise by 4.25%.

Table 6: Results for Heckman two step model with Hofstede's cultural distance

	<i>Step 1-Selection</i> (whether movie is distributed)						<i>Step 2-Consumption</i> (box office) Time-lag		
	Null	Movie variables		Country variables		Random coefficient			
<b>Fixed effect</b>									
(Intercept)	0.674 ***	-0.413 ***		3.132 *		307.658 ***		4.46 ***	-8.598 ***
<b>Movie-level</b>									
Adventure		0.080 ***		0.080 ***		0.313 ***		0.211 ***	
Animation		0.126 ***		0.132 ***		0.529 ***		0.451 ***	
Biography		-0.191 ***		-0.190 ***		-0.609 ***		-0.398 ***	
Comedy		-0.058 ***		-0.057 ***		-0.204 ***		-0.044 ***	
Crime		0.018 *		0.014		0.065		-0.043 **	
Documentary		0.130 ***		0.132 ***		0.379 **		0.196 ***	
Drama		0.014 **		0.015 **		0.057 *		-0.054 ***	
Family		-0.070 ***		-0.067 ***		-0.335 ***		-0.011	
Fantasy		0.112 ***		0.116 ***		0.493 ***		0.233 ***	
Horror		0.141 ***		0.142 ***		0.561 ***		0.458 ***	
Romance		0.028 *		0.028 ***		0.085		0.161 ***	
Sci-Fi		0.030 ***		0.033 ***		0.275 ***		0.065 ***	
Thriller		0.023 ***		0.024 ***		0.110 **		0.004	
log(Budget)		0.297 ***		0.297 ***		1.178 ***		1.152 ***	
log(Metascore)		0.207 ***		0.209 ***		0.888 ***		0.321 ***	
PG		0.116 ***		0.120 ***		0.519 ***		0.181 ***	
PG-13		0.193 ***		0.200 ***		0.772 ***		0.418 ***	
R		0.243 ***		0.251 ***		0.923 ***		0.480 ***	
Sequel		0.056 ***		0.056 ***		0.301 ***		0.334 ***	
<b>Country-level</b>									
log(PPP)				-0.074 ***		8.897 **		-0.346 ***	
log(TOEFL)				-1.704 *		-134.943 ***		4.679 ***	
log(CD)				-0.054		-58.482 ***		-0.318	
log(Population)				-0.127 ***		-24.075 ***			
log(Production)				0.020 **		-0.098 *			
<b>Country-movie</b>									
Timelag								-0.068 ***	
Timelag <sup>2</sup>								-0.011 ***	
Mills Ratio								0.982 ***	
<b>Random effect</b>									
var. Intercept	0.044	0.045		0.050		549971		0.264	22.501
var. Residual	0.175	0.151		0.149				0.429	
var.log(PPP)						1776		0.9943	
var.log(TOEFL)						138270		8.692	
var.log(CD)						2289		32.116	
<b>Model fit</b>									
AIC	33316	27408		27400		26590		40892	31815
Pseudo R square	0.20	0.52		0.58		0.99		0.38	0.87
Log likelihood	-16655	-14176		-13679		-13256			
<b>Observations:</b>	30125	30125		30125		30125		20374	20374
<b>ICC</b>	20.2%	22%		25%				38.1%	
<b>Chi square(<math>\Delta d_f</math>)</b>						1996(8)	***		

\*\*\* p value <0.01; \*\* p value<0.05; \* p value<0.1

In support of Hypothesis 1, movies tend to release in culturally closer countries ( $\beta_{\log(CD)} = -58.482, p < 0.01$ ). Regarding the Hypothesis 4a, I find the opposite result that countries with high English proficiency have less exporting likelihood.

Next, the Heckman step 2 model measures the actual box office performance after distributors' selection. I started with the unconditional model without any variable. Country accounts for 38.1% of the total variance ( $0.264 / (0.264 + 0.429)$ ).

There are 30125 observations after cleaning the missing data in the first step, and 20374 observations in the second step. In accordance with the random coefficients model, step 2 employs the same estimation method. Additional variable inverse Mills Ratio is added to adjust the selection bias, and the release day differences between domestic market and each foreign market (Time-lag) and the square of it are added as the movie-country combined variable to investigate the influence of rollout strategy. The number of movie production is regarded as the exclusion restriction, so it is excluded in step 2 model. Pseudo R square is 0.87, implying that the model fits data better.

Firstly, inverse Mills Ratio is highly significant ( $\beta = 0.982, p < 0.01$ ), and thus it should be included as a function to modify selection bias. Secondly, most of the movie factors display similar results to random coefficients model, except for movie genre crime, family, romance, and thriller. Thirdly, country-level factors were observed to have interesting findings. In support of Hypothesis 4b, English proficiency positively but insignificantly influences the box office per capita ( $\beta_{\log(TOEFL)} = 4.679, p > 0.1$ ). For Hypothesis 5, oppositely, I found that purchasing

power parity has a negative effect on box office per capita ( $\beta_{\log(PPP)} = -0.346, p < 0.01$ ). For Hypothesis 2, the release day difference does have negative effect on box office per capita ( $\beta_{\log(Timelag)} = -0.068, p < 0.01$ ), and this relationship is non-linear ( $\beta_{\log(Timelag)^2} = -0.011, p < 0.01$ ).

As mentioned in the literature review, the two frequently referred cultural frameworks, Hofstede's and Schwartz's emphasize different perspectives of culture. To investigate the application of both cultural measurements in motion picture industry, I compare them with the same Heckman procedure. Regarding of the comparability, the country data for Hofstede's is restricted to the same 49 countries as Schwartz's, which is 8 countries less than the whole data, but the movies are still the 769 Hollywood wide release in 2012-2016. In the random coefficients model for 49 countries, results of Hofstede's cultural framework are robust, that cultural distance from the United States and foreign market is significantly negative ( $\beta_{CD-H} = -58.482, p < 0.01$ ) in exporting and insignificant in box office per capita ( $p > 0.1$ ). Interestingly, Schwartz's cultural distance is insignificant in exporting likelihood ( $p > 0.1$ ), and significantly positive ( $\beta_{CD-S} = 4.102, p < 0.01$ ) in box office per capita. In support of Hypothesis 3, Hofstede's is better at predicting exporting, while the Schwartz's is better at estimating the individual consumption.



Table 7: Cultural distance of Hofstede and Schwartz with limited countries

	<i>Step 1-Selection</i> (whether movie is distributed)				<i>Step 2-Consumption</i> (box office)					
		Hofstede 49 countries		Schwartz 49 countries		Hofstede 49 countries		Schwartz 49 countries		
<b>Fixed effect</b>										
Intercept	0.729 ***	314.950	**	231.408	**	4.46 ***	-25.049	***	-17.148	***
<b>Movie-level</b>										
Adventure		1.317	***	1.322	***	1.503	***	1.354	***	
Animation		1.438	***	1.440	***	1.723	***	1.563	***	
Biography		-0.345	***	-0.345	***	-0.806	***	-0.745	***	
Comedy		-0.762	***	-0.764	***	-1.202	***	-1.099	***	
Crime		1.026		1.028		-1.221	***	-1.095	***	
Documentary		1.284	***	1.286	***	1.460	***	1.300	***	
Drama		1.040	***	1.041	***	-1.226	***	-1.099	***	
Family		-0.564	**	-0.566	**	-1.226		-1.126		
Fantasy		1.474	***	1.474	***	1.538	***	1.379	***	
Horror		1.535	***	1.536	***	1.754	***	1.587	***	
Romance		1.056		1.057		1.446	***	1.314	***	
Sci-Fi		1.280	***	1.282	***	1.351	***	1.219	***	
Thriller		1.069	***	1.071	***	1.261		1.133		
log(Budget)		1.204	***	1.203	***	1.234	***	1.139	***	
log(Metascore)		0.961	***	0.963	***	0.366	***	0.337	***	
PG		0.530	***	0.532	***	0.220	***	0.184	***	
PG-13		0.744	***	0.747	***	0.458	***	0.399	***	
R		0.907	***	0.910	***	0.537	***	0.460	***	
Sequel		0.310	***	0.310	***	0.347	***	0.331	***	
<b>Country-level</b>										
log(PPP)		5.289		6.500		-0.122		-0.078		
log(TOEFL)		-110.596	*	-97.936	*	9.065	***	2.963	*	
log(CD)		-25.036	**	25.556		0.460		4.102	***	
log(Population)		-12.838	***	-9.810	***					
log(Production)		0.017		0.003						
<b>Country-movie</b>										
Timelag						-0.066	***	-0.065	***	
Timelag <sup>2</sup>						-0.012	***	-0.011	***	
Mills Ratio						1.119	***	0.908	***	
<b>Random effect</b>										
var. Intercept	0.057	4.626				0.264	273.562		11.899	
var. Residual	0.189					0.429	0.2735			
var.log(PPP)		1455		1603			0.5214		0.246	
var.log(TOEFL)		10.66		3403			73.619		2.733	
var.log(CD)		567.2		9644			6.482		5.546	
<b>Model fit</b>										
AIC	29101	23003		22999		40892	28057		28083	
Pseudo R square	0.23					0.38	0.74		0.70	
Log likelihood	-14548	-11468		-11472						
<b>Observations:</b>	26336	26336		26336		17967	17967		17967	
<b>ICC</b>	19.6%					38.1%	37.6%		37.6%	

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.05$

## Chapter 6: Discussion and Implication

### 6.1 Cultural distance

The main purpose of this study is to examine the role of national culture in the movie industry. Taking the Hollywood movies as objects of study, I emphasized the gap between movie distribution and consumption in the international market. For both stages, movie factors and country factors are employed to measure the distribution likelihood and box office performance. Specifically, the national culture is captured by the cultural distance from domestic market, United States, and the cultural distance is calculated by Kogut and Singh's (1988) formulation. Firstly, Hofstede's cultural distance only has a significantly negative effect on the distribution but not the consumption. It implies that cultural distance influences the distributors' decision on movie releasing, and distributors prefer to release a movie in foreign countries that have similar national culture. However, moviegoers regardless of the cultural distance in their movie consumption. Secondly, the comparison of Hofstede's and Schwartz's cultural distance with the new restricted dataset confirms the robustness of findings of Hofstede's cultural distance. Interestingly, Schwartz's cultural distance is significantly positive on consumption but insignificant in distribution. It suggests an opposite finding from Hofstede's that distributors ignore the culture factor, and moviegoers' from culturally distant countries consume Hollywood movies more.

Craig, Greene, & Douglas (2005) summarize that Hofstede's dimensions theorize the cultural influence from a national level and that Schwartz focuses on the culture values at the individual level. Schwartz (1994) also states that his cultural framework has 7 level values to reflect normative cultural influence and 10 individual level value to reflect individuals' unique

experience. Beyond Hofstede's dimensions, Schwartz's further includes individuals' value in the framework. To apply in the movie industry, distributors predict country-level performance based on their understanding of national culture, while moviegoers make decisions based on the cultural background and individual experience. The findings of my study suggest that Hofstede's cultural measurement is significant in distribution stage, while Schwartz's is significant in moviegoers' consumption stage. It offers evidence to support the claim of and Schwartz (1996) Craig et al. (2005) about the different emphasis of two cultural measurements.

Traditionally, previous researchers found the significantly negative effect on the performance of movies, such as Craig et al. (2005), Lee (2006, 2009), and Kim & Jensen (2014). However, Moon & Song (2015) applied Hofstede's measurement to examine the culture discount and culture premium in the international marketing of American movies, and concluded that there is a U shape relationship between inter-country cultural distance and box office performance, confirming the combination of culture discount and culture premium in the movie consumption. Furthermore, Moon et al. (2016) found a curvilinear effect of Hofstede's cultural distance on box office in the absence of cultural compatibility, suggesting a positive effect in the high cultural distance index, and he referred it as "cultural novelty seeking". Similarly, Ratner et al. (1999) proposed "variety seeking" to explain the phenomenon that audience seek different watching experience through those culturally distant movies. My finding reveals that moviegoers are dominated by culture premium, thus the cultural distance has a positive impact on movie consumption.

Compare with those previous studies, my study differentiates the distribution and consumption and adjusts the selection bias in selection by the inverse Mills ratio in Heckman two-step model. This method allows for the heterogeneity of distributors and audiences. Although Kim & Jensen (2014) employed the same model, they neglect the hierarchical structure of international movie data. It is the possible explanation for the inconsistent coefficients of cultural distance in their model developing. Griffith, Yalcinkaya, & Rubera (2014) notice the Hierarchical structure of movie data; whereas, this study only focuses on the analyzation of collected data, ignoring the potential selection bias. Akdeniz & Talay (2013) consider the Hierarchical structure of those movie data and conduct the Heckman selection model, but their selection model only concerned about whether movie sample selection of this study exists bias. Although my study employs the similar approach as Akdeniz & Talay (2013), the main goal of Heckman model has shifted to the potential selection bias of distribution. The comparisons of major literature are listed in the Table 7 below.

Table 8: Major literature comparison:

	Data	DV	Heckman two-step	Data structure	Findings
Akdeniz & Talay (2013)	2007-2011, 1116 movies, 27 countries	Opening weekend	Only movie-related signals and movie controls (insignificant Mills Ratio)	HLM with interaction	IC, UA, MA, PD moderation
Kim & Jensen (2014)	2004-2006, European movies, 16 EU countries	Exporting likelihood	Cox proportional hazard model OLS regression (insignificant Mills Ratio)	No HLM	CD moderation on the domestic BO and award
Griffith, Yalcinkaya, & Rubera (2014)	2006-2007, 259 movies, 16 countries	Box office standardized by population	no	HLM with interaction	UA, MA, PD, GDP moderation for Timelag and numbers of country release
My research	2012-2016, 784 wide release, 56 countries	Exporting likelihood Log(BO/pop)	Movie and country related in both steps	Mixed effect HLM	1. Hofstede & Schwartz 2. Distribution 3. Time-lag

## 6.2 Rollout strategy

In the study of Moon et al. (2016), the variable “Release day difference” also has a significantly negative effect ( $\beta = -0.00523, p < 0.01$ ) on country-level box office performance. The purpose of their study is to examine the economic and cultural influence on the movie performance, regarding the rollout strategy as a control factor. I extend the investigation to rollout strategy, because 37% of the movies release simultaneously or before the United States in my dataset. Thus, the Time-lag square is added to compensate the inefficiency in describing the relationship between Time-lag and movie consumption when Time-lag is negative.

As the results suggest that both coefficients of Time-lag and Time-lag square are negatively significant, I focus on the non-linear relationship between Time-lag and box office

performance. The new quadratic equation below takes the log of Time-lag as an independent variable, keeping the log of box office per capita as the dependent variable. In this equation, the Time-lag is still the log of release day difference between the United States and foreign market. Specifically, the intercept aggregates other factors by fixing each variable at the median.

$$\log(\text{Box office per capita}) = \alpha + \beta_1 \text{Timelag} + \beta_2 \text{Timelag}^2$$

$$\alpha = \sum_{n=1}^{29} \gamma_n \text{Median}_n$$

Given the Time-lag interval is between -10 and 10, Figure 1 visualizes this relationship between box office per capita and Time-lag within the range (-10,10). The vertex is around Time-lag=-4, box office per capita =1.4. From Time-lag=-10 to -4, this curve graph increases, starting from the point Time-lag=-10, box office per capita= 0.8. After vertex, it decreases until Time-lag=10, where box office per capita achieves the minimum value 0. This finding indicates that the box office performance increases with the release day difference before the critical point, and that box office performance decreases with the release day difference increases after the critical point when keeping all the other factors constant.

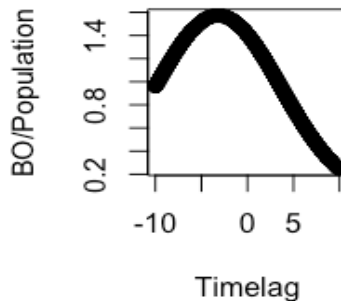


Figure 3: Non-linear relationship between time lag and box office per capita

As previous research states, simultaneous introduction and sequential introduction strategies both have benefits and drawbacks (Chrysochoidis & Wong, 1998; Stremersch & Tellis, 2004), thus it is essential for distributors to understand and manage the rollout even they have decided to release a movie in a specific country. For the empirical application of my research results, neither simultaneous or sequential are the optimal rollout strategies; instead, shifting the release time ahead of United States have a greater likelihood to achieve more box office when all the other factors are fixed.

### **6.3 English proficiency**

Language is regarded as an essential component of culture because language reflects the culture which it is embedded in (Craig et al., 2005). In international movie marketing, language can act as barrier or bridge to foreign audiences. Furthermore, language also plays an important role in connecting cultural communities and establishing links between its members, resulting in similar preferences (Usunier et al., 2005). Thus, audience English-speaking countries should prefer those movies produced in English. Compare to the manipulation of Craig et al. (2005) and Akdeniz & Talay (2013), they only dummy coding the English speaking or not, my study employs more comprehensive measurement to capture the English proficiency. In my study, the finding indicates the average TOEFL score has a positive effect on audience consumption, which provides support to the argument that language shapes the similar movie preference. Audience from higher English proficiency countries consumes more on Hollywood movies when keeping all other factors fixed.

However, in the hypothesis testing about the effect of English proficiency on the distribution likelihood, the results indicate that distributors are willing to release movies in lower English proficiency countries. Based on my data and estimation method, the possible explanation to this seemingly inconsistent result could be the TOEFL test is for non-English speaking countries, and some English-speaking countries do not have high test scores, such as average TOEFL for the United States and Portugal are 89 and 94 correspondingly. After the selection of distributors, audiences can only access to those selected movies. As discussed in the cultural distance part, audiences are dominated by culture premium; thus, the audience from culturally distant countries prefer Hollywood movies. In this situation, English proficiency becomes increasingly important for moviegoers to understand the dialogue, because even though movies can be translated and subtitled or even dubbed, potential loss of fluency or accuracy during transmissions could also diminish the pleasure of watching.

#### **6.4 Economic wealth**

In my results, distributors are targeting audiences in countries have high purchasing power parity, but those moviegoers decrease their consumption on Hollywood movies. Moon et al. (2016) research on the economic impacts on the box office performance and found a curvilinear effect of GDP per capita on box office. Categorizing GDP per capita as low, medium and high, their results indicated that the audiences from medium GDP country consume American movies the most, because they have more money to spend compared to low GDP, and prefer more to American movies than high GDP. For the drop of preference in high GDP, they explained that the consumers at high GDP have more domestic products to choose from. This study could offer a possible explanation to my findings. Distributors aim to increase the revenue



by releasing movies in economically wealthier countries, but those targeted consumers have more competitive domestic options. It could highlight a gap between the distributors and audiences, and distributors could shift their attention from top economic wealth to subprime. Although Moon et al. (2016) and I employ different indexes to capture the national wealth, GDP per capita and PPP respectively, the findings are consistent; however, they focus the consumption of moviegoers, and my study differentiates the different preferences in distribution and consumption.

## Chapter 7: Limitation and Recommendation

Although this study has shed new light on the literature of cultural impacts in the field of international movie marketing, it has several limitations in the progress of estimation and interpretation. Firstly, it is unmanageable to track each movie, so all the missing data is attributed to not released. However, unavailability could be ascribed to two reasons: the movies are not released in a specific country, or the movies released but the information is unavailable on Box OfficeMojo.com and IMDb. In the first step unconditional model, estimation begins with 46909 observations, but only 30125 observations left in the country-effect model and random coefficients, where country factor and movie factor data missing could all result in those data deficient. Furthermore, in the second step consumption model with full data, applied observations deducted to 20374. Although the data missing of the newly added variable, release day difference, not releasing and foreign box office data missing could all lead to the observed differences, the inverse Mills ratio is assumed to capture all the non-releasing bias by distributors.

Secondly, this study employs the national average TOEFL score to capture the English proficiency. Although it offers a better insight into the language ability than the dummy coding of previous research, such as Craig et al. (2005) and Akdeniz & Talay (2013), TOEFL test fails to offer the daily usage of English. Alternatively, Kim & Jensen (2014) conduct a dummy variable to control for the compatibility of the national official language and the film language, and Moon & Song (2015) employ the percentage of the population in English use. In the same vein, the variable such as international student of each country in the United States could also offer a better measurement of the English proficiency in a daily use base.

Thirdly, although this study employs both Hofstede's and Schwartz's cultural framework to measure the national level and individual level cultural distance and differentiates the cultural impacts on distributors and audiences, the positive effect of cultural distance on moviegoers' consumption could be further explored. Research of Moon et al. (2016) have demonstrated the curvilinear effect of cultural distance on the country-level box office. Another possible area of future research on Schwartz' cultural measurement would be to investigate whether its effect is simply linear or curvilinear.

Fourthly, although this study gathers general signals of each movie, such as genre, MPAA ratings, and Metascore critic ratings, it does not engage with the content of each movie. Moon & Song (2015) use the text mining technic to identify how individual audience interprets the content of movies, offering a closer insight into the compatibility of movie content and audience interpretation. In future investigations, it might be possible to include more content-related movie variable to have a better understanding of the individual movie.

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