

Cultural variations in the use of marketing signals: a multilevel analysis of the motion picture industry

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Abstract Movies are experiential products that include a myriad of cultural cues, and their box office performance varies across countries with different cultural backgrounds. The profusion of studies on the motion picture industry notwithstanding, this aspect has been largely ignored in the literature. Drawing on signaling theory, this study examines how a country's cultural fabric moderates the impact of movie-related signals on the opening weekend box office performance. We test our hypotheses using a multilevel model and a comprehensive dataset of 1,116 movies released in 27 countries between 2007 and 2011. Results reveal that the impact of star power on box office performance is amplified in high uncertainty avoidance and indulgent cultures, while it is attenuated in high power distance cultures. Moreover, the positive relationship between sequels and performance wanes in individualist cultures. Movies with high production budgets perform better in culturally open countries, while critics' reviews are more instrumental in high uncertainty avoidance cultures.

Keywords Signaling theory · Motion pictures · Cross-cultural research · Hierarchical linear modeling

Drawing from the information economics paradigm, signaling theory is based on the notion that sellers have better knowledge about the actual quality of their products than do buyers. This situation, referred to as information asymmetry,

creates an imbalance of power in transactions, which can lead to problems of adverse selection, moral hazard, information monopoly, and market failure. In order to avoid such problems, firms emit market signals to inform their stakeholders about their activities, and to decrease uncertainty about the quality of their products and services (Hult 2011; Kirmani and Rao 2000). As such, marketing is an especially relevant field for signaling applications since pre-purchase evaluation of product quality is based on the information firms provide to the marketplace. This information, which can take the form of price, advertisement, or any other marketing tool, is referred to as a signal and aims to reduce customers' uncertainty and to facilitate their decision making (Rao et al. 1999). Marketing signals are even more important in assessing the actual quality of complex, credence, or experience goods, which can be assessed over time, through specialized expertise or with use (Nelson 1970). For instance, in order to improve the perception of its brand in consumers' minds and lure them away from its reputation of low quality cars, Hyundai has stepped up its design, research and development, and it has communicated these changes to its consumers via marketing signals including aggressive advertising campaigns during the Super Bowl and the Academy Awards and exceptional warranties of 10-year, 100,000-mile (BusinessWeek 2007). Hyundai's decade-long signaling efforts have paid off, as it has become the fastest growing car brand in the U.S., from a market share of 1.4% in 2000 to 5.1% in 2011.¹

This research examines the implications of market signaling for a highly popular "experience product" market: the motion picture industry. Pre-consumption uncertainty about movie quality, coupled with severe time constraints due to short product life cycles, impedes customers' ability to make informed decisions. Therefore, information asymmetry

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¹ <http://hyundaiamerica.us/an-american-success-story/u-s-demand-sales-market-share/>

constitutes a particularly significant barrier in this industry that movie studios must overcome expeditiously to get positive returns on their investment. Accordingly, they invest heavily in certain attributes of a movie such as the cast and advertising to send positive signals about the quality of a movie. That said, globalization in motion pictures has forced the studios toward cross-country product management strategies that are more complex since marketing movies on an international scale only augments the degree and variety of information asymmetry that needs to be attenuated. Under such circumstances, it has become more challenging as well as essential to understand the effects of signaling strategies on product performance in each target market, since consumers' tastes and demand patterns vary significantly across cultures.

The purpose of this research is to advance knowledge on the variation of factors influencing new product performance across countries. Drawing from the signaling theory, this study develops and empirically tests a model linking various signals, and their interactions with culture, to box office performance in the motion picture industry. Based on the premise that the perception of the same movie signal sent by a studio varies by the cultural milieu in a country, and that this variation is inevitably reflected in the movies' performance across countries, we believe that there is a need to understand how cultural differences moderate the impact of movie-related signals on box office performance in a cross-country context.

The motion picture industry is pertinent to the purpose of this study for the following reasons. First, inability to evaluate the actual quality of a movie before seeing it causes moviegoers to seek and process available movie-related signals in the environment (De Vany and Walls 1999). Thus, studios continuously emit marketing signals in order to positively influence their potential viewers' perceptions. Second, movies are culturally embedded products, leading to differences in the utilization of the same movie-related signals by moviegoers from different cultural backgrounds (Dawar and Parker 1994). Third, the box office performance of a movie varies significantly across countries, which warrants further research. For example, the movie *Australia* generated \$50 million in the United States and \$162 million abroad, whereas *The Blind Side* earned \$256 million in the United States but only \$53 million abroad. Further, while the movie *Vicky Cristina Barcelona* fared well in France (\$15 million), it flopped in South Korea (\$360,000). Fourth, with revenues reaching \$100 billion, the motion picture industry is a significant contributor to the U.S. economy, and it has become of particular interest to international marketing scholars since the ultimate profitability of a Hollywood movie increasingly depends on its foreign revenues, which currently comprise 65% of the total revenue.

This study has several contributions to signaling, motion picture, and international marketing literatures. First, research on how the impact of marketing signals on product performance varies across countries has been scarce, despite the fact that consumption patterns are affected by national culture (Steenkamp et al. 1999). This study addresses this gap by examining the variation in the effects of marketing signals on performance in a cross-country context by including the moderation effects of specific cultural dimensions. Second, the profusion of studies in the motion picture industry notwithstanding, only a handful has been conducted in the international context (e.g., Craig et al. 2005; Eliashberg et al. 2006). Based on the signaling theory, this study fills that lacuna by examining how box office performance of a movie varies across countries. Third, to the best of our knowledge, our dataset, comprised of 1,116 movies released in 27 countries between 2007 and 2011, represents the most comprehensive geographical and temporal coverage to date in the international motion picture literature. Fourth, we build and test a multilevel model in accordance with the hierarchical structure of our dataset (i.e., movies nested within countries). The mostly-overlooked pervasiveness of the nested data structure in international marketing phenomena (e.g., Roth 1995) necessitates more robust applications of multilevel models in the field, and the international motion picture industry represents a particularly appropriate hierarchical setting (Leenders and Eliashberg 2011).

The organization of the article is as follows. First, we review the extant literature on market signaling, discuss the impact of foreignness in cross-cultural research, and present research hypotheses. Then, we explain the data collection process, measures, and empirical model estimation. Finally, we present our findings and conclude with the discussion, managerial implications, and suggestions for future research.

Theoretical background

Signaling theory

Based on the information economics paradigm, the main focus of signaling theory is whether a signal delivers credible information while reducing information asymmetry between parties of a transaction (Spence 1973). In the context of marketing, information (i.e., signals) that firms convey to their customers about unobservable product quality is referred to as signals (Rao et al. 1999), which are classified into two categories: *default-independent signals* and *default-contingent signals*. The former refers to a firm's additional upfront expenditure regardless of whether it defaults on its signal, and the latter refers to a firm's willingness to

forego its future revenues if it defaults on its signal. According to signaling theory, consumers benefit from the existing signals in the environment to differentiate a high-quality from a low-quality product if the firm with a high-quality product has an incentive (e.g., higher revenues) to send specific signals and the firm with low-quality product has a disincentive (e.g., loss of revenues versus the case of no signaling) to mimic them (Kirmani and Rao 2000).

Under imperfect information, signaling can serve as a source of competitive advantage for a firm to deliver accurate information to their customers. When product quality is not readily observable, one of the challenges in marketing is to send a credible signal in the form of an advertisement, brand name, or any marketing tool with the purpose of transforming prospective consumers in the target market into actual consumers of the offered product or service. Firms frequently utilize signals to demonstrate (1) product quality via product aesthetics (Lampel and Shamsie 2000) and brand alliances (Rao et al. 1999) to their customers; (2) firm quality via financial statements and top management team prestige to their potential investors (Zhang and Wiersema 2009); (3) increased rivalry via new product preannouncements to their competitors (Homburg et al. 2009); (4) prospective demand for their products via pre-launch advertising and high price to retailers (Chu 1992); and (5) sustainable business activities via certifications, use of recycled materials, and credible spokespeople to various stakeholders (Connelly et al. 2011).

Consumers' reactions to these signals are also important in the implementation of signaling strategies since their effectiveness depends on whether receivers avidly look for signals in the environment. When consumers (1) need to reduce the perceived risk of a transaction, (2) evaluate experience goods where quality is fully understood with use, or (3) cannot assess quality because it is a complex product requiring special expertise (Rao and Monroe 1988), they update their beliefs about product quality by observing and interpreting product- and market-related signals within the environment, where signals serve as heuristics and help customers to evaluate product quality before purchase.

Signaling and national culture in the motion picture industry

Movie characteristics have a direct influence on a movie's performance by generating viewership through a value chain consisting of production, distribution, and exhibition (Eliashberg et al. 2006). The literature on market signaling in the motion picture industry (e.g., Basuroy et al. 2006) shows that the quality of a movie is difficult to assess because of its intangible and experiential nature, and thus moviegoers look for credible information that studios provide using marketing- and product-related signals (e.g., cast of a movie, production budget) to distinguish between high-

and low-quality movies. Accordingly, there is an impetus for studios that have high-quality movies to emit signals that can be interpreted by moviegoers as the studio's confidence in its film's quality. For any studio action to constitute a credible signal, consumers must be convinced that the studio would not incur upfront costs unless the product was of high quality that its investments could be recouped (Basuroy et al. 2006; Kirmani and Rao 2000). Once this perception is established, consumers are strongly influenced by studios' signals (Hennig-Thurau et al. 2006). This research stream, nonetheless, has been generally conducted in the U.S. motion picture market, despite the fact that certain cultural traits—such as risk aversion, individualism, and consumers' attitude toward foreign products—might influence moviegoers' perception of quality signals (Erdem et al. 2006; Parameswaran and Yaprak 1987).

Culture, one of the mostly widely studied concepts in the social sciences, is broadly defined as the values, beliefs, and assumptions learned in early childhood—when people are most susceptible to learning and assimilating—that distinguish one group of people from another (Hofstede et al. 2010). It is deeply embedded in people's everyday lives and relatively impervious to change as well as an important driver of systematic differences in behavior across nations (Steenkamp 2001). For instance, there is ample empirical evidence that drivers of customer satisfaction (Morgeson et al. 2011), new product development (Sivakumar and Nakata 2003), and market orientation practices (Kirca and Hult 2009) differ by national culture. More relevant to this study, cross-cultural studies of media consumption suggest that the reception of foreign motion picture and television products are subject to cultural discount and affected by the cultural characteristics of both the product and the host country (Hoskins and Mirus 1988). Specifically, it has been shown that audiences across the world tend to gravitate toward media content that is consistent with their own culture, and cultural products can lose some of their appeal when they travel to other countries where audiences do not necessarily share the same cultural tastes, values, or cues to appreciate the product (Jayakar and Waterman 2000).

Separate research streams on market signaling, motion picture industry, and influence of culture on the attitude toward foreign media products are rather substantial. However, more research is warranted on the intersection of these areas. Therefore, this study posits that the cultural fabric of a country is likely to affect the ways by which audiences evaluate signals about foreign media products. To be more precise, we expect to find substantial differences in movie viewership and use of movie-related signals across countries. Besides, without analyzing different country conditions in which movie consumption occurs, it is hard to

generalize the relationships between movie attributes and box office performance reported in studies conducted in a single-country setting to an international scale. Therefore, this study focuses on the moderating effects of cultural characteristics on the relationship between movie signals and opening weekend box office revenues in a cross-country context.

Hypotheses development

We develop hypotheses about the interaction effects between movie-level signals and country cultural characteristics on box office performance. Specifically, we focus on four popular movie-related signals: (1) sequel movies, (2) production budget, (3) star power, and (4) expert ratings. While the conceptualization of sequels as signals is associated with the signaling role of brand name extensions (Sood and Drèze 2006), a sequel serves as both a default-independent and default-contingent signal. It is a credible signal since the upfront investment in making a sequel is greater because of the additional costs that studios are willing to incur based on its likely success. Also, a poor-quality sequel mitigates the prequel's equity, limits the future revenues, and risks the release of more sequels. Hence, sequels usually lead to a higher performance than non-sequels (Basuroy et al. 2006).

Production budget signals movie quality as producers, who trust in the quality of a movie and expect to earn high revenues, have an incentive to invest more. Production budget is a default-independent signal because deceiving consumers by aggressively investing in the production of a low-quality movie can backfire. Studios can recoup this investment only if its target audience perceives the movie as being high quality. As such, previous research shows that big-budget movies have a higher probability of success (Elberse and Eliashberg 2003).

Star power is one of the most visible signals for a movie. Similar to production budget, it is a default-independent signal because including star actors and actresses in a movie requires a considerable upfront expenditure without knowing whether it will be recouped in the future. However, star presence as a signal goes beyond its financial investment aspect; the familiarity of moviegoers with the cast of a movie attenuates financial risks and makes it sensible to bestow power on stars (De Vany and Walls 1999). Extant literature reports a positive relationship between the star power of a movie and box office performance (e.g., Basuroy et al. 2003).

Last but not least, a key signal with an impact on box office performance is third party reviews. Since movies are experiential products, third party information (e.g., customer or expert reviews) usually attenuates information asymmetry between moviegoers and studios (Holbrook 1999). Besides, more than one-third of moviegoers consult the reviews and

advice of film critics and choose films based on favorable reviews (Basuroy et al. 2003). As such, research shows that positive reviews are expected to increase box office revenues (e.g., Reinstein and Snyder 2005).

Several frameworks have been developed to capture the multi-faceted nature of national culture (e.g., Hall 1976; Hofstede 1980; Ronen and Shenkar 1985; Schwartz 1994). Among these, Hofstede's framework is the most widely used and comprehensive in terms of the number of sampled national cultures, and has become the *de facto* norm in international marketing studies (Soares et al. 2007). While subject to criticism (e.g., Kirkman et al. 2006), Hofstede's framework has been empirically validated and its replications have demonstrated its robustness (Magnusson et al. 2008) across a number of marketing phenomena such as innovativeness (Tellis et al. 2003), new product development (Nakata and Sivakumar 1996), price perceptions (Bolton et al. 2010), advertising appeals (Okazaki et al. 2010), and consumer responses to market signals of quality (Dawar and Parker 1994). Based on its relevance, robustness, wide range of applications, and unmatched geographical scope, Hofstede's framework (i.e., individualism, uncertainty avoidance, power distance, indulgence versus restraint),² along with cultural openness, are used to develop the moderation hypotheses.

Individualism versus collectivism The distinction between individualism and collectivism pertains to the strength of social ties between individuals and group norms. In individualist societies, where social fabric and group norms are loose, people's behaviors are based on their own individual preferences, and they regard their personal goals, motivations, and desires as more important than those of the in-group (Steenkamp et al. 1999). As such, individualist cultures ascribe greater importance to personal freedom of choice, experience, and self-expression. In collectivist societies, on the other hand, social structure is tightly bound and people exhibit more conformity and a higher degree of group behavior. Moreover, collectivist cultures emphasize in-group harmony, consensus, and subordination of individual

² Masculinity and long-term orientation are excluded from this study for the following reasons. Masculinity involves two components: attitudes toward gender roles and quality of life. Given these components—similar to the previous studies in the literature on the effects of marketing signals in different countries (e.g., Erdem et al. 2006)—it is not plausible to directly hypothesize how this dimension can moderate the effect of marketing signals used in this study. In a similar vein, the dimension of long-term orientation focuses on the preference of future-oriented values over past- and present-oriented values (Hofstede et al. 2010). As such, it is not possible to generate any straightforward hypotheses as to how this dimension might influence the affects of movie-related signals on box office performance. Moreover, long-term orientation scores are available for only a small subset of countries included in this study; hence, including it would decrease cross-cultural variation of the findings.

goals to group goals when necessary. Previous studies show that the degree of individualism versus collectivism is instrumental in explaining the differences in consumer behavior across cultures, in general and decoding of signals, in particular. For instance, in collectivist cultures, consumers are more susceptible to social influence while making a purchase decision compared to consumers in individualist cultures, where consumption patterns demonstrate less dependence to other people and more emphasis on independence and individual gratification (Nicholls et al. 1997). In a similar vein, Erdem et al. (2006) show that collectivism is related to a greater reliance on the “group” in evaluating brand signals and that collectivism amplifies the effects of brands as marketing signals on performance. Specifically, collectivism increases the reliance on, and importance of, the brand choice of the group, and brands regarded highly by the group are more likely to be preferred by others as individuals in collectivist cultures value conformity.

In the motion picture industry literature, the conceptualization of sequels as signals is based on the signaling role of brands (Basuroy et al. 2006). Therefore, we expect that the effect of a “sequel” in establishing quality expectations for a movie, and thereby on its box office performance, may be more potent, similar to that of a brand, in collectivist cultures. Sequels, as indicators of previous success, signal a preference of the group in the past and therefore can have a greater impact on consumer preferences in collectivist cultures. Besides, *ceteris paribus*, both the positive effect of a sequel on perceived quality of a movie and the impact of this perception on individuals’ decision to watch the movie can reinforce their sense of belonging to a group; another aspect emphasized more in collectivist cultures. Therefore:

H1a: The effect of sequels on a movie’s opening weekend box office revenue is greater (lower) when cultural individualism is low (high).

People in collectivist cultures tend to engage in more information search as well as rely more heavily on informal sources of information in their social network or through interpersonal information exchange and word-of-mouth. That is, social network is the main source of information. Conversely, media is the primary source of information for people in individualist cultures, and they tend to utilize formal sources of information such as third party and expert reviews as their primary source when conducting information search, relying less on in-group information exchange (Erdem et al. 2006). For instance, people living in individualist cultures highly rate advertising and reviews as useful sources of information about new products (Hofstede et al. 2010). Accordingly, we expect individualist cultures to exhibit more reliance to the reviews of movie critics:

H1b: The effect of critics’ reviews on a movie’s opening weekend box office revenue is greater (lower) when cultural individualism is high (low).

Uncertainty avoidance Uncertainty avoidance captures “the extent to which people feel threatened by ambiguous situations and have created beliefs and institutions that try to avoid these” (Hofstede et al. 2010, p. 191), and it refers to the endeavors of certain cultures to increase stability and predictability and to eschew ambiguity. Because of our focus on information asymmetry and variance in the interpretation of signals in different cultures, it is the most relevant cultural dimension for this study. Consumers in high uncertainty avoidance cultures are more risk-averse and less tolerant of ambiguity. They tend to reduce aversion and ambiguity through seeking and favoring credible signals (Roth 1995). Moreover, they utilize signals more frequently since they are less sensitive to search costs and more willing to collect information than consumers in low uncertainty avoidance cultures.

In the context of the movie industry, consumers can utilize various signals to decrease uncertainty about the quality of a movie (Basuroy et al. 2006). In this research, we propose that consumers in high uncertainty avoidance cultures will utilize these signals more intensely than those in low uncertainty avoidance cultures because signal use should be correlated positively to a culture’s risk aversion level (Dawar and Parker 1994), and the effects of movie-level signals will be stronger in high uncertainty avoidance cultures since these cultures are more sensitive to ambiguity. Therefore:

H2: The effect of (a) sequels, (b) production budget, (c) star power, and (d) critics’ reviews on opening weekend box office revenue of a movie is greater (lower) when cultural uncertainty avoidance is high (low).

Power distance Hofstede et al. (2010) define power distance as “the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally” (p. 61). Low power distance cultures tend to be egalitarian and attribute less importance to differences in prestige, wealth, and status in their interpersonal relationships. In contrast, high power distance cultures emphasize prestige, wealth, and authority as crucial factors in forming social classes as well as in shaping the relationships between them. Attaining and maintaining prestige in such societies is an important source of personal satisfaction. As such, in high power distance cultures, people tend to increase their power as a source of satisfaction, and they are highly motivated by social status and affiliation norms. Erdem et al. (2006) show that this aspect of power distance drives purchase decisions since

signals that confer social status, wealth, and prestige are more important for people in high power distance cultures since they are particularly motivated by status. Moreover, similar to collectivist societies, people living in high power distance cultures are sensitive to social norms and tend to exhibit conformity to the norms of the classes they are affiliated with as well as the ones they aspire to (Roth 1995).

Following Basuroy et al. (2006) and Erdem et al. (2006), this study posits that sequels, similar to brands, may have a stronger effect on perceived quality, risk, and prestige in high power distance cultures. Sequels, as indicators of previous and potential success, are expected to be more important signals in high power distance cultures as they might have a stronger influence on increasing perceived quality and decreasing perceived risk. In a similar vein, stars in a movie can attract more audience in high power distance cultures since (1) they personify power, prestige, wealth, and status (i.e., values that are more emphasized in these cultures) and (2) such societies exhibit stronger motivations to follow and imitate their aspirational social classes, to which movie stars are very likely to belong. Therefore:

H3: The effect of (a) sequels and (b) star power on the opening weekend box office revenue of a movie is greater (lower) when cultural power distance is high (low).

Indulgence versus restraint Indulgence versus restraint is extracted by Minkov (2007) from the World Values Survey (2006) and subsequently added to Hofstede's classic model of culture. Here, indulgence refers to "a tendency to allow relatively free gratification of basic and natural human desires related to enjoying life and having fun," whereas restraint is "a conviction that such gratification needs to be curbed and regulated by strict social norms" (Hofstede et al. 2010, p. 281). People in indulgent cultures tend to be more content, optimistic, and extroverted. They relish leisurely activities and cherish their friendships. As such, they have more appreciation of music and films and maintain closer communication not only with their family, friends, and colleagues but also with foreigners (Hofstede et al. 2010, p. 297). People in restrained cultures, on the other hand, tend to be more discontent, pessimistic, and neurotic. They scorn leisure while praising thrift as a valuable trait (Hofstede et al. 2010, p. 291). They tend to be more reserved and collected in their relationships with family, friends, and colleagues and maintain diffident and timorous behaviors toward foreigners (Hofstede et al. 2010, p. 297).

If we relate the aspects of the indulgence versus restraint dimension of culture to people's tendency to enjoy movies, it appears that people in indulgent cultures will be predisposed to spend their time and money in

movie theaters since movies are experiential/hedonic goods, the consumption of which primarily involves sensory or aesthetic pleasure, fun, fantasy, and excitement. The utilization of movie signals will be greater in indulgent cultures primarily because of this predisposition to continuously seek such feelings. Essentially, this study posits that this tendency will decrease the sensitivity to the cost of collecting information about movies and increase the willingness to enjoy movies for people in indulgent cultures compared to restrained cultures. Therefore, consumers in indulgent cultures are more likely to search for and process movie signals. This accumulation of knowledge can eventually render people in indulgent cultures more informed about movies, and such a high level of knowledge about, and taste in, movies can lead to a more deliberate need, and superior ability, to process movie signals for assessing quality. Therefore:

H4: The effect of (a) sequels, (b) production budget, (c) star power, and (d) critics' reviews on the opening weekend box office revenue of a movie is greater (lower) when cultural indulgence is high (low).

Cultural openness For almost half a century, scholars have been analyzing why foreignness encumbers a product's performance, despite its superior qualities. Extant literature, replete with studies on consumers' prejudices against foreign products, provides factual evidence that consumers may irrationally prefer domestic products over their foreign competitors (Balabanis et al. 2001). One of the most countenanced explanations of this prejudice is consumer ethnocentrism, a concept defined as "the beliefs held by consumers about the appropriateness, indeed morality, of purchasing foreign-made products" (Shimp and Sharma 1987, p. 280). Consumer ethnocentrism, caused by love and concern for one's country, entails a disinclination to purchase foreign products lest doing so has serious repercussions for the local economy, culture, and values (Sharma et al. 1995).

Cultural openness, a concept negatively related to consumer ethnocentrism, refers to one's enthusiasm for experiencing the artifacts of foreign cultures and willingness to interact with people from other countries (Sharma et al. 1995). Therefore, while consumer ethnocentrism is a more general construct explaining negative attitudes and behaviors toward consumption of anything foreign, cultural openness is a more narrowly defined concept regarding positive attitudes and behaviors toward foreign cultures. Numerous emic and etic studies of culture reveal that cultural openness is positively related not only to a penchant for foreign goods and services but also to the interest in global consumer culture along with a proclivity to savor *objets d'art* from other cultures (Kaynak and Kara 2002).

Movies, appositely, are laden with cultural cues of the country in which they are created. As such, a foreign movie will inevitably include cultural manifestations (e.g., values, beliefs, and lifestyles) that may be regarded either as outlandish and unwelcome or enthralling and acceptable in different cultures. This study posits that cultural openness will increase the curiosity about, and receptiveness of, such manifestations. Accordingly, in tandem with the literature, we expect that countries that are culturally more open to foreign goods and services will also exhibit higher interest in foreign movies and hence will utilize movie-related signals more intensely to infer movie quality. Specifically, such heightened interest in foreign movies will decrease the perceived costs of collection and processing of movie-related signals. As such, we expect people in open cultures to be more inquisitive about (1) whether a movie is a sequel since it is a signal of previous success, (2) a movie's production budget, signaling the amount of risk the producers take and indicating their confidence in the movie, (3) a movie's cast since the involvement of more popular and respected actors and actresses in a movie will signal movie quality, and (4) what critics think about a movie as their thoughts will attenuate information asymmetry. Therefore:

H5: The effect of (a) sequels, (b) production budget, (c) star power, and (d) critics' reviews on the opening weekend box office revenue of a movie is greater (lower) when cultural openness is high (low).

Controls

Movie-level controls Drawing from the literature, we include nine movie-level control variables in the model. First, we control for the effect of distributor power in local markets by taking into account the impact of the extent of local market knowledge and the power of a distributor of a movie in a given country. Previous research has suggested that, *ceteris paribus*, movies distributed by major studios (e.g., Warner Bros., Universal, Columbia) have superior market performance than those distributed by independently owned distributors (Elberse and Eliashberg 2003; Neelamegham and Chintagunta 1999). Second, we control for the release strategy of a movie by distinguishing between wide- and limited-releases by country since wide release and availability of a movie through its theatrical run are important drivers of movie viewership not only in the United States but also in international markets (Elberse and Eliashberg 2003; Neelamegham and Chintagunta 1999). Third, we control for seasonality as a potential factor to affect the opening box office revenue of a movie since (1) demand for movies fluctuates significantly over the course of a year, such that big-budget movies are released in the beginning of summer and

during the Christmas season, and (2) box office revenues gradually decline starting midsummer until early September (e.g., Einav 2007). Following Elberse and Eliashberg (2003), Basuroy et al. (2006), and Leenders and Eliashberg (2011), we also account for the strength of a movie vis-à-vis its competition with (1) the number of screens on which a movie is released in a country and (2) the screen share of the movie in the market. Next, we incorporate the rivalry effects of (3) other new movies released in the same week and (4) the movies that are already running at the time of the movie's release. Furthermore, we control for the effects of advertising and genre in our analyses since consumer demand for movies exhibits above-average advertising elasticity and genre is instrumental in a movie's box office performance both in local (Joshi and Hanssens 2009) and international (e.g., Craig et al. 2005) markets. Finally, we control for the awards that a movie receives, because several studies have accounted for the effects of awards, albeit post-launch, in predictive models of box office performance and have reported significant "award effects" (e.g., Einav 2007).

Country-level controls We control for five country-level covariates. First, we control for the language of the host country, as it is an important factor in audience preference of media products (e.g., Ksiazek and Webster 2008). Since all the movies in the dataset are in English, in non-English speaking countries, they need to be subtitled or dubbed, which may inhibit the comprehension of the dialogue (Craig et al. 2005). Second, we account for the local supply of movie theaters. Third, we control for the strength of the domestic motion picture industry in a country. Last, but not least, we incorporate the effects of total population and GDP in a country.

Methodology

Data

Our data collection efforts had two primary objectives: (1) including as many movies as possible in the analyses without sacrificing comparability of the variations in box office performance across countries and (2) incorporating as many countries as possible in order to establish maximum cultural variance in the dataset. We followed a three-step approach to meet these goals. First, to establish comparability, we included only the movies produced or co-produced in the United States. Not only was this approach parallel to the dominance of American movies in the international film trade and it

helped control for the cultural content of the movies in the dataset. Furthermore, it was simply not possible to find data for all of the movie-level covariates in the model for non-U.S. movies. Second, to establish within-country variance, we included movies from a variety of genres since consumers' attitude toward a certain genre could vary across cultures as well (Hofstede et al. 2010). Finally, to ascertain cross-country variance, we focused on countries that significantly differed with respect to cultural characteristics. This approach yielded a dataset of 1,116 movies released between 2007 and 2011 in 27 countries: Australia, Austria, Chile, Czech Republic, Denmark, Finland, France, Germany, Hungary, Israel, Japan, the Netherlands, New Zealand, Norway, Philippines, Poland, Portugal, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, the United Kingdom, the United States., Uruguay, and Venezuela. Hence, all inhabited continents were represented in the sample. Forty-eight movies (4% of the sample) were released in all 27 countries sampled, while 368 (33% of the sample) were available in more than 20 countries in the dataset.

We collected movie-level data from the Internet Movie Database (IMDB), with the exceptions of box office revenues and critics' reviews, which we gathered from Box Office Mojo and Rotten Tomatoes, respectively. We collected country-level data from Hofstede et al. (2010), International Social Survey Program (ISSP) (2009), *The World Factbook* of the Central Intelligence Agency, and the Euromonitor International. Table 1 lists the variables used in this study.

Dependent variable

Following prior research (e.g., Hennig-Thurau et al. 2006; Joshi and Hanssens 2009), we operationalized box office performance ($OPENREV_{ij}$) as the opening weekend box office revenue of movie i in country j expressed in the U.S. dollars. To control for the effects of skewness in distribution and outliers in the data, natural logarithm of this variable was used in the analyses.

Independent variables

Movie-level variables We estimated the effects of four different movie-related signals: (1) sequel, (2) production budget, (3) star power, and (4) critics' reviews. Following Hennig-Thurau et al. (2006), we used a dummy variable coded as one if movie i was a sequel ($SEQUEL_i$). We used the natural logarithm of the production budget of a movie i ($BUDGET_i$) as reported by the IMDB. We operationalized the star power of a movie i ($STAR_i$) as a composite measure based on the

high-profile actors, actresses, directors, and producers included in a movie (Hennig-Thurau et al. 2006). Specifically, if an actor, actress, director, or producer was mentioned on a movie's poster, we classified them as a "star" and calculated the mean box office receipts of that person's three most recent movies. After adding up the individual star power for all the people mentioned in a movie's poster, we took the natural logarithm of the sum to calculate the total star power of movie i ($STAR_i$). For critics' reviews of movie i ($REVIEWS_i$), we used the professional critics' ratings on Rotten Tomatoes, which exclusively publishes the reviews of accredited movie critics who are active members of either select movie critic societies/associations or print publications.

Country-level variables We estimated the effects of the culture in country j on the opening weekend box office revenues of a movie i via the cultural dimensions of individualism (IDV_j), uncertainty avoidance (UAI_j), power distance (PDI_j), and indulgence versus restraint (IVR_j) from the framework developed by Hofstede et al. (2010). We operationalized the cultural openness of country j ($OPENNESS_j$) using the ISSP data on national identity (2009). In the ISSP survey, respondents were asked about their attitudes toward foreign cultural presence and their preference to their own country's films and programs. The ISSP reported the country-averaged score for each item. Following Steenkamp and Geyskens (2006), we constructed the measure of cultural openness of country j ($OPENNESS_j$) by averaging the countries' mean scores on these items.

Control variables At the movie level, we used the dummy variable $MAJOR_{Lij}$ to indicate whether movie i was distributed by a major local distributor in country j . Building on Elberse and Eliashberg (2003), we distinguished between wide openers and limited openers since limited movies had different success drivers. We used the dummy variable $WIDE_{ij}$, with the value of one if movie i was released in at least 20% of the available screens in country j in line with Elberse and Eliashberg (2003). Following Joshi and Hanssens (2009), we captured the effects of seasonality of demand using a series of dummy variables for the five major movie release seasons globally³: $CHRISTMAS_i$, $WINTER_i$, $SPRING_i$, $SUMMER_i$, and $FALL_i$ (base case). We used four variables to control for the competitive strength of a movie and its environment: $NSCREENS_{ij}$, the natural logarithm of the number of screens at launch for movie i in country j ; $SCSHARE_{ij}$, the

³ For countries in southern versus northern hemisphere, seasonality codes vary in the dataset.

Table 1 Variable descriptions

Variable	Description	Measure	Source
OPENREV _{ij}	Opening weekend box office of revenue of movie <i>i</i> in country <i>j</i>	Natural logarithm of the opening weekend box office of revenue of movie <i>i</i> in country <i>j</i>	Boxofficemojo.com
SEQUEL _i	Movie <i>i</i> is a sequel	Dummy variable indicating a movie <i>i</i> is a sequel	IMDB
BUDGET _i	Production budget of movie <i>i</i>	Natural logarithm of the production budget of movie <i>i</i>	IMDB
STAR _i	Total star power of movie <i>i</i>	Following Hennig-Thurau et al. (2006), calculated as the natural logarithm of the sum of the individual star powers of actors and actresses in movie <i>i</i>	IMDB
REVIEWS _i	Critics' reviews for movie <i>i</i>	Movies are evaluated on a 1–100 scale by movie critics	Rottentomatoes.com
IDV _j	individualism score of country <i>j</i>	individualism index value of country <i>j</i>	Hofstede et al. (2010)
UAI _j	Uncertainty avoidance score of country <i>j</i>	Uncertainty avoidance index value of country <i>j</i>	Hofstede et al. (2010)
PDI _j	Power distance score of country <i>j</i>	Power distance index value of country <i>j</i>	Hofstede et al. (2010)
IVR _j	Indulgence vs. restraint score of country <i>j</i>	Indulgence vs. restraint index value of country <i>j</i>	Hofstede et al. (2010)
OPENNESS _j	Cultural openness score of country <i>j</i>	Average of the items of the attitude measure toward foreign cultures for country <i>j</i>	ISSP (2009)
MAJOR_L _{ij}	Major local distributor for movie <i>i</i> in country <i>j</i>	Dummy, indicating whether a movie is distributed by a major distributor in a given country	Boxofficemojo.com
WIDE _{ij}	Movie <i>i</i> is a wide opener in country <i>j</i>	Dummy variable, which equals 1 if movie <i>i</i> was released in at least 20% of the available screens in country <i>j</i>	Boxofficemojo.com
CHRISTMAS _i	Movie <i>i</i> is launched during Christmas	Dummy variable indicating movie <i>i</i> was released during Christmas	IMDB
WINTER _i	Movie <i>i</i> is launched during winter	Dummy variable indicating movie <i>i</i> was released during winter	IMDB
SPRING _i	Movie <i>i</i> is launched during spring	Dummy variable indicating movie <i>i</i> was released during spring	IMDB
SUMMER _i	Movie <i>i</i> is launched during summer	Dummy variable indicating movie <i>i</i> was released during summer	IMDB
NSCREENS _{ij}	Number of screens	Natural logarithm of the number screens at launch for movie <i>i</i> country <i>j</i>	Boxofficemojo.com
SCSHARE _{ij}	Screen share	Ratio of the number of screens movie <i>i</i> is released to the total number of screens available in country <i>j</i>	Boxofficemojo.com
COMP_NEW _{ij}	Competition from new releases	Number of new releases in the opening weekend of movie <i>i</i> in country <i>j</i>	Boxofficemojo.com
COMP_ONG _{ij}	Competition from ongoing movies	Total number of competing movies in the week movie <i>i</i> is launched	Boxofficemojo.com
ADVERTISING _i	Advertising expenditures	Natural logarithm of the advertising budget of movie <i>i</i>	Kantar Media
ROMANCE _i	Movie <i>i</i> is a romance movie	Dummy variable indicating movie <i>i</i> is a romance movie (base case)	IMDB
THRILLER _i	Movie <i>i</i> is a thriller movie	Dummy variable indicating movie <i>i</i> is a thriller movie	IMDB
ACTION _i	Movie <i>i</i> is an action movie	Dummy variable indicating movie <i>i</i> is an action movie	IMDB
DRAMA _i	Movie <i>i</i> is a drama movie	Dummy variable indicating movie <i>i</i> is a drama movie	IMDB
COMEDY _i	Movie <i>i</i> is a comedy movie	Dummy variable indicating movie <i>i</i> is a comedy movie	IMDB
AWARD _i	Number of awards for movie <i>i</i>	Total number of awards movie <i>i</i> won	IMDB
ENGLISH _j	English speaking country	Dummy variable indicating English is the primary language in country <i>j</i>	CIA World Factbook
SEATS _j	Total number of cinema seats	Total number of cinema seats available in country <i>j</i>	Euromonitor
LMOVIES _j	Local movie production	Ratio of the annual number of movies by local producers to the total number of movies released in country <i>j</i>	Euromonitor
POPULATION _j	Population	Natural logarithm of the population of country <i>j</i>	CIA World Factbook
TOTGDP _j	Total GDP	Natural logarithm of the total GDP of country <i>j</i>	CIA World Factbook

ratio of the number of screens on which movie *i* was released to the total number of screens available in country *j*; *COMP_NEW_{ij}*, the number of new releases during the release of movie

i in country *j*; and *COMP_ONG_{ij}*, the total number of competing movies in the week when movie *i* was launched (Basuroy et al. 2006; Elberse and Eliashberg 2003). Following

Elberse and Eliashberg (2003) and Karniouchina (2011), we included also the natural logarithm of the advertising budget of movie i , $ADVERTISING_i$. Similar to Joshi and Hanssens (2009) and Neelamegham and Chintagunta (1999), we used the IMDB to classify movie genres using dummy variables $ROMANCE_i$, $THRILLER_i$, $ACTION_i$, $DRAMA_i$, and $COMEDY_i$. Last but not least, we controlled for the effects of awards by including the variable $AWARD_i$, which represented the total number of Oscars won by movie i .

At the country level, we used the dummy variable $ENGLISH_j$ with the value of one if country j is English-speaking and zero otherwise. We accounted for the strength of the local motion picture industry using two controls. First, we captured the strength of local demand using $SEATS_j$, the total number of cinema seats available in country j . Second, we measured the intensity of local supply using $LMOVIES_j$, which represented the ratio of the annual number of movies by local producers to the total number of movies released in country j . Finally, we controlled for the effects of population with $POPULATION_j$ and total GDP with $TOTGDP_j$, expressed as natural logarithm in country j using the data provided in *The World Factbook* of the Central Intelligence Agency.⁴

Hierarchical linear modeling (HLM) analysis

In the empirical model, movies are nested within countries in a multilevel data setting (Bryk and Raudenbush 1992). Applying Ordinary Least Squares (OLS) to this setting imposes several problems resulting in biased estimates and extremely small standard errors, because in OLS, estimation is conducted only at the individual level without taking into consideration higher-level data. HLM is specifically developed to deal with multilevel data, allowing for simultaneous estimation conducted at multiple levels. It also enables researchers to estimate cross-level effects. HLM offers several advantages for the estimation of multi data settings, including simultaneous partitioning of variance–covariance components (Bryk and Raudenbush 1992) and a Bayesian estimation approach that improves the precision of estimates relative to traditional approaches (Hofmann 1997). Therefore, we used HLM to test the empirical model where the Level 1 model included the effects of movie-level variables and the Level 2 model included the effects of

culture-related variables. Along with some main effects, the full model tested for several interactions between variables at the movie and country levels. Following Bryk and Raudenbush (1992), we centered movie-level variables within countries and country-level variables with respect to their corresponding means. Empirically, Level 1 (e.g., movie-level) and Level 2 (e.g., country-level) models are demonstrated with the following equations:

Level 1:

$$\begin{aligned} OPENREV_{ij} = & \beta_{0j} + \beta_{1j}SEQUEL_i + \beta_{2j}BUDGET_i \\ & + \beta_{3j}STAR_i + \beta_{4j}REVIEWS_i \\ & + \beta_{5j}MAJOR_{L_{ij}} + \beta_{6j}WIDE_{ij} \\ & + \beta_{7j}CHRISTMAS_i + \beta_{8j}WINTER_i \\ & + \beta_{9j}SPRING_i + \beta_{10j}SUMMER_i \\ & + \beta_{11j}NSCREENS_{ij} + \beta_{12j}SCSHARE_{ij} \\ & + \beta_{13j}COMP_NEW_{ij} + \beta_{14j}COMP_ONG_{ij} \\ & + \beta_{15j}ADVERTISING_i + \beta_{16j}ROMANCE_i \\ & + \beta_{17j}THRILLER_i + \beta_{18j}ACTION_i \\ & + \beta_{19j}DRAMA_i + \beta_{20j}COMEDY_i \\ & + \beta_{21j}AWARD_i + r_{ij} \end{aligned} \quad (1)$$

Level 2:

$$\begin{aligned} \beta_{0j} = & \gamma_{00} + \gamma_{01}IDV_j + \gamma_{02}UAI_j + \gamma_{03}PDI_j + \gamma_{04}IVR_j \\ & + \gamma_{05}OPENNESS_j + \gamma_{06}ENGLISH_j + \gamma_{07}SEATS_j \\ & + \gamma_{08}LMOVIES_j + \gamma_{09}POPULATION_j \\ & + \gamma_{010}TOTGDP_j + \mu_{0j}, \end{aligned} \quad (2a)$$

$$\begin{aligned} \beta_{1j} = & \gamma_{10} + \gamma_{11}IDV_j + \gamma_{12}UAI_j + \gamma_{13}PDI_j + \gamma_{14}IVR_j \\ & + \gamma_{15}OPENNESS_j + \mu_{1j}, \end{aligned} \quad (2b)$$

$$\begin{aligned} \beta_{2j} = & \gamma_{20} + \gamma_{21}UAI_j + \gamma_{22}IVR_j + \gamma_{23}OPENNESS_j + \mu_{2j}, \end{aligned} \quad (2c)$$

$$\begin{aligned} \beta_{3j} = & \gamma_{30} + \gamma_{31}UAI_j + \gamma_{32}PDI_j + \gamma_{33}IVR_j \\ & + \gamma_{34}OPENNESS_j + \mu_{3j}, \end{aligned} \quad (2d)$$

$$\begin{aligned} \beta_{4j} = & \gamma_{40} + \gamma_{41}IDV_j + \gamma_{42}UAI_j + \gamma_{43}IVR_j \\ & + \gamma_{44}OPENNESS_j + \mu_{4j}, \end{aligned} \quad (2e)$$

$$\beta_{qj} = \gamma_{q0} + \mu_{qj}, \text{ for } q = 5, 6, 7, \dots, 21; \quad (2f)$$

where i and j denote movies and countries, respectively. Substituting Eqs. 2a–2f into Eq. 1 generated the following HLM model, which was estimated to test the hypotheses:

⁴ The values for $SEATS_j$, $LMOVIES_j$, $POPULATION_j$, $TOTGDP_j$ vary annually.

Full Model:

$$\begin{aligned}
 OPENREV_{ij} = & \gamma_{00} + \gamma_{01}IDV_j + \gamma_{02}UAI_j + \gamma_{03}PDI_j \\
 & + \gamma_{04}IVR_j + \gamma_{05}OPENNESS_j \\
 & + \gamma_{06}ENGLISH_j + \gamma_{07}SEATS_j \\
 & + \gamma_{08}LMOVIES_j + \gamma_{09}POPULATION_j \\
 & + \gamma_{010}TOTGDP_j + \gamma_{10}SEQUEL_i \\
 & + \gamma_{11}IDV_j * SEQUEL_i + \gamma_{12}UAI_j * SEQUEL_i \\
 & + \gamma_{13}PDI_j * SEQUEL_i + \gamma_{14}IVR_j * SEQUEL_i \\
 & + \gamma_{15}OPENNESS_j * SEQUEL_i + \gamma_{20}BUDGET_i \\
 & + \gamma_{21}UAI_j * BUDGET_i + \gamma_{22}IVR_j * BUDGET_i \\
 & + \gamma_{23}OPENNESS_j * BUDGET_i + \gamma_{30}STAR_i \\
 & + \gamma_{31}UAI_j * STAR_i + \gamma_{32}PDI_j * STAR_i \\
 & + \gamma_{33}IVR_j * STAR_i + \gamma_{34}OPENNESS_j * STAR_i \\
 & + \gamma_{40}REVIEWS_i + \gamma_{41}IDV_j * REVIEWS_i \\
 & + \gamma_{42}UAI_j * REVIEWS_i + \gamma_{43}IVR_j * REVIEWS_i \\
 & + \gamma_{44}OPENNESS_j * REVIEWS_i \\
 & + \gamma_{50}MAJOR_L_{ij} + \gamma_{60}WIDE_{ij} \\
 & + \gamma_{70}CHRISTMAS_i + \gamma_{80}WINTER_i \\
 & + \gamma_{90}SPRING_i + \gamma_{100}SUMMER_i \\
 & + \gamma_{110}NSCREEN_{ij} + \gamma_{120}SCSHARE_{ij} \\
 & + \gamma_{130}COMP_NEW_{ij} + \gamma_{140}COMP_ONG_{ij} \\
 & + \gamma_{150}ADVERTISING_i + \gamma_{160}ROMANCE_i \\
 & + \gamma_{170}THRILLER_i + \gamma_{180}ACTION_i \\
 & + \gamma_{190}DRAMA_i + \gamma_{200}COMEDY_i \\
 & + \gamma_{210}AWARD_i + error\ term
 \end{aligned} \tag{3}$$

The movie-level error term was normally distributed as $\epsilon_{ij} \sim (0, \sigma^2)$. The random effects μ_{qj} ($q=0, \dots, 21$) were multivariate normal distributed over countries, each with an expected value of 0, $\text{var}(\mu_{qj}) = \tau_{qq}$ and $\text{cov}(\mu_{qj}, \mu_{q'j}) = \tau_{qq'}$ ($q, q'=0, \dots, 21$). μ_{qj} was the idiosyncratic deviation of country j from the overall effect on the intercept (β_{0j}) or slope ($\beta_{1j}, \dots, \beta_{21j}$) while controlling for the country-level predictors where available. In the Level 2 model, $\beta_{0j}, \dots, \beta_{21j}$ were specified as random coefficients suggesting that the average box office revenue, and the effects of *SEQUEL_i*, *BUDGET_i*, *STAR_i*, and *REVIEWS_i* along with other movie-level control variables were allowed to vary across countries.

Robustness checks

Movies released in 27 countries could be systematically different from movies released only in the U.S. market. As such, the possibility that movies included in the sample were not selected completely at random might have caused a selection bias. We utilized the Heckman two-step estimation method (Heckman 1979) to see whether the sample was subject to selection bias. First, we estimated a Probit model using maximum likelihood to assess the effects of movie-related signals and other movie controls, all of which could be expected to

influence opening weekend box office revenues. Results revealed that the inverse Mills ratio was statistically insignificant (i.e., $\lambda = -.583, p > .10$), and they were robust after accounting for potential endogeneity due to selection bias.

The main focus of this study is on the moderating effects of a country’s cultural milieu on the relationship between certain movie-related signals and box office performance. Efforts to build a comprehensive empirical model notwithstanding, there might have been some unobservable factors that simultaneously drove opening weekend box office performance and the movie-level signals. In that case, those unobserved factors were absorbed by the error term, which was, therefore, correlated with the model covariates. That is, movie-level signals became endogenously determined, which could lead to inconsistent standard estimators. To test for plausible endogeneity, we used the Hausman-Wu test (Hausman 1978). Specifically, in the empirical model, for each potentially endogenous movie-level signal, we included both the variable and its instruments. A χ^2 -test on the significance of these instruments constituted the exogeneity test. Results revealed that production budget and star power might have caused an endogeneity bias in the estimation. Following previous work (e.g., Elliott and Simmons 2008; Treme 2010), we used “studio power,” operationalized as the average of the total box office revenues of a studio for the last 3 years before a movie was launched, as the instrument for production budget. Studios with more financial resources can afford to produce big-ticket movies and use their clout and reputation to stimulate demand for the opening week. Then, we used “star trend,” operationalized as the average search volume index of a movie’s stars in the last 3 years before its launch in a given country, as the instrument for star power. This variable allowed us to eliminate inconsistencies in estimations as well as to capture the inter-country variations in the levels of recognition of a movie’s star power. Using these two instrumental variables, we accounted for the endogeneity in the multilevel analyses following Ebbes et al. (2004) and Kim and Frees (2006).

We used the correlations (Table 2) and variance inflation factor (VIF) to check for multicollinearity among the predictors. Of the 528 correlations included in our study, 487 (i.e., 92.2%) were below $|0.400|$, and the highest correlation was 0.498 (between *WIDE_{ij}* and *OPENREV_{ij}*). The average and the maximum VIF values (2.34 and 5.94, respectively) were substantially lower than 10, a commonly used cutoff value. Thus, we concluded that multicollinearity did not affect our results.

Table 2 Pairwise correlation matrix of variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 OPENREV _{ij}	1															
2 SEQUEL _i	0.215	1														
3 BUDGET _i	0.402	0.224	1													
4 STAR _i	0.131	-0.040	0.361	1												
5 REVIEWS _i	-0.015	-0.053	-0.066	0.019	1											
6 IDV _j	0.243	-0.026	-0.111	-0.054	0.016	1										
7 UAI _j	-0.100	0.024	0.078	0.041	-0.005	-0.409	1									
8 PDI _j	-0.036	0.010	0.034	0.007	-0.041	-0.416	0.411	1								
9 IVR _j	0.006	-0.019	-0.052	-0.026	-0.003	0.273	-0.472	-0.361	1							
10 OPENNESS _j	0.014	0.004	0.010	0.005	-0.032	-0.299	0.366	0.476	-0.348	1						
11 MAJOR_L _{ij}	0.323	0.097	0.349	0.158	0.028	0.070	-0.070	-0.144	0.110	-0.120	1					
12 WIDE _{ij}	0.498	0.206	0.438	0.137	-0.076	0.196	0.032	-0.126	-0.033	-0.051	0.270	1				
13 CHRISTMAS _i	0.018	0.028	0.037	0.028	-0.026	0.022	-0.019	-0.037	0.018	-0.023	0.021	0.024	1			
14 WINTER _i	-0.019	-0.130	-0.034	0.036	0.038	-0.015	0.009	0.001	-0.023	0.007	-0.005	-0.036	-0.091	1		
15 SPRING _i	-0.006	0.050	0.040	0.024	-0.049	0.002	0.002	0.006	0.004	0.007	0.014	0.013	-0.082	-0.348	1	
16 SUMMER _i	0.048	0.060	0.035	-0.035	0.011	0.000	-0.002	0.009	0.015	0.007	0.019	0.060	-0.078	-0.330	-0.299	1
17 NSCREEN _{ij}	0.455	0.144	0.334	0.110	-0.080	0.288	-0.082	-0.043	-0.021	0.011	0.283	0.488	0.004	-0.030	0.003	0.044
18 SCSHARE _{ij}	0.477	0.355	0.445	0.161	-0.010	-0.181	0.075	0.150	-0.028	0.078	0.245	0.464	0.009	-0.108	0.064	0.080
19 COMP_NEW _{ij}	0.242	-0.090	-0.233	-0.113	-0.037	0.298	-0.144	-0.075	0.050	-0.016	-0.013	-0.020	0.002	-0.011	-0.025	-0.047
20 COMP_ONG _{ij}	0.301	-0.049	-0.221	-0.120	-0.033	0.352	-0.208	-0.175	0.122	-0.045	0.001	0.030	-0.019	-0.025	0.023	-0.035
21 ADVERTISING _i	0.345	0.108	0.451	0.274	0.029	-0.114	0.069	0.021	-0.043	-0.002	0.347	0.327	0.030	0.066	0.013	-0.011
22 ROMANCE _i	0.012	-0.083	-0.030	0.070	-0.131	-0.005	0.005	0.005	-0.003	0.008	-0.048	0.020	-0.002	-0.006	0.003	0.016
23 THRILLER _i	-0.050	-0.102	-0.047	0.008	-0.114	-0.028	0.011	0.035	-0.002	0.021	-0.079	-0.075	-0.028	0.016	0.037	-0.050
24 ACTION _i	0.145	0.123	0.281	0.041	-0.093	-0.027	0.022	0.015	-0.028	0.004	0.077	0.168	0.002	-0.052	0.059	0.025
25 DRAMA _i	-0.199	-0.138	-0.262	0.042	0.262	0.036	-0.021	-0.023	0.012	-0.014	-0.111	-0.247	-0.006	0.148	-0.044	-0.095
26 COMEDY _i	-0.060	-0.074	-0.126	0.047	-0.083	0.051	-0.039	-0.035	0.034	-0.018	0.048	-0.029	0.040	-0.047	-0.004	0.033
27 AWARD _i	0.050	-0.044	0.034	0.007	0.338	-0.019	0.010	0.003	-0.010	-0.003	0.006	-0.015	-0.003	0.105	-0.074	-0.012
28 ENGLISH _j	0.215	-0.033	-0.147	-0.079	-0.011	0.303	-0.432	-0.312	0.443	-0.286	0.011	0.146	0.012	-0.023	0.011	0.005
29 SEATS _i	0.356	-0.020	-0.094	-0.047	-0.018	0.276	-0.023	0.118	-0.281	0.403	0.009	0.040	-0.017	-0.014	0.006	0.005
30 LMOVIES _i	0.296	-0.022	-0.133	-0.083	-0.042	0.102	-0.065	0.243	-0.141	0.469	-0.048	-0.040	-0.013	-0.029	0.021	0.011
31 POPULATION _j	0.448	-0.026	-0.142	-0.086	-0.047	0.158	-0.090	0.317	-0.085	0.290	-0.006	0.038	-0.023	-0.026	0.015	0.013
32 TOTGDP _j	0.424	-0.032	-0.163	-0.089	-0.013	0.480	-0.240	-0.157	0.032	0.046	0.088	0.085	0.001	-0.027	0.007	0.010

Table 2 (continued)

Variable	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1 OPENREV _{ij}															
2 SEQUEL _i															
3 BUDGET _i															
4 STAR _i															
5 REVIEWS _i															
6 IDV _j															
7 UAI _j															
8 PDI _j															
9 IVR _j															
10 OPENNESS _j															
11 MAJOR_L _{ij}															
12 WIDE _{ij}															
13 CHRISTMAS _i															
14 WINTER _i															
15 SPRING _i															
16 SUMMER _i															
17 NSCREEN _{ij}	1														
18 SCSHARE _{ij}	0.422	1													
19 COMP_NEW _{ij}	0.288	-0.259	1												
20 COMP_ONG _{ij}	0.338	-0.216	0.487	1											
21 ADVERTISING _i	0.289	0.364	-0.233	-0.235	1										
22 ROMANCE _i	0.007	0.008	-0.029	-0.031	-0.001	1									
23 THRILLER _i	-0.032	-0.075	0.014	0.012	-0.024	-0.079	1								
24 ACTION _i	0.115	0.181	-0.070	-0.051	0.113	-0.134	-0.135	1							
25 DRAMA _i	-0.184	-0.280	0.075	0.066	-0.210	-0.147	-0.148	-0.253	1						
26 COMEDY _i	-0.031	-0.096	0.033	0.038	0.009	-0.135	-0.136	-0.231	-0.254	1					
27 AWARD _i	-0.009	0.026	-0.043	-0.032	0.099	-0.058	-0.048	-0.049	0.152	-0.062	1				
28 ENGLISH _j	0.251	-0.083	0.384	0.459	-0.159	-0.006	-0.012	-0.040	0.043	0.046	-0.025	1			
29 SEATS _j	0.349	-0.127	0.393	0.389	-0.110	-0.009	0.008	-0.013	0.027	0.002	-0.017	-0.008	1		
30 LMOVIES _j	0.296	-0.074	0.462	0.452	-0.165	-0.009	0.017	-0.022	0.031	0.000	-0.020	0.246	0.402	1	
31 POPULATION _j	0.481	-0.065	0.437	0.494	-0.171	-0.011	0.018	-0.025	0.030	0.006	-0.026	0.354	0.444	0.411	1
32 TOTGDP _j	0.450	-0.178	0.462	0.417	-0.185	-0.018	-0.001	-0.034	0.053	0.017	-0.026	0.383	0.425	0.496	0.408

All correlations except the ones in **bold**, *italicized* fonts are significant at $p < .05$

Results

Given the emphasis on capturing maximum variance in our dataset with regard to both movie and country characteristics, opening weekend box office revenues of movies ($OPENREV_{ij}$) vary significantly from as low as US\$70 (for *Motherhood* in Taiwan) to approximately US\$170 million (for *Harry Potter and the Deathly Hallows Part 2* in the United States). In a similar vein, production budget figures vary significantly between US\$2,400 (for *Noise*) and US\$300 million (for *Pirates of the Caribbean: At World's End*). Moreover, of the 1,116 movies in the dataset, 103 are sequels (e.g., *Terminator Salvation: The Future Begins* and *Indiana Jones and the Kingdom of the Crystal Skull*), 81 are thrillers (e.g., *Mirrors*), 141 are action movies (e.g., *Fast & Furious*), 320 are dramas (e.g., *Seven Pounds*), 253 are comedies (e.g., *Get Smart*), and 72 are romantic movies (e.g., *Valentine's Day*). While two movies receive 100% rating from the critics (i.e., *Leap Year* and *Taxi to the Dark Side*), only one movie receives the lowest rating of 1% (i.e., *Daddy Day Camp*). Lastly, the movie *The Twilight Saga: Eclipse* has the highest number of opening weekend screens (i.e., 4,468 in the U.S.), while many movies in the dataset open in only one theater (e.g., *Adrift in Manhattan* in the U.S. and *Crank: High Voltage* in New Zealand). Table 3 highlights the descriptive statistics.

Table 4 shows the results of a two-level HLM analysis conducted via the HLM 6.02 software package (Raudenbush et al. 2004). All coefficients are unstandardized since standardized coefficients are problematic in HLM, due to the division of the variance across levels. We present the results of full maximum likelihood estimation because it (1) has certain desirable properties such as consistency and efficiency, and (2) allows us to compare the model fit across various models (see Table 6). In addition, we report the relative effect sizes of all estimates in the results since the HLM method does not provide straightforward absolute effect sizes. Following Gielens and Steenkamp (2007), we report the effect sizes using the t-values of the parameter estimates and the degrees of freedom.

Regarding the hypotheses, in support of H1a, we find that individualist cultures tend to place less emphasis on whether a movie is a sequel or not ($\gamma_{11}=-0.004$; $p<0.001$). H1b proposes that the effect of critics' reviews is higher in individualist cultures; however, this hypothesis is not supported ($\gamma_{41}=0.005$; $p>.10$).

We hypothesize that uncertainty avoidance positively moderates the effects of movie-level signals. Effect of sequels on opening weekend box office revenue is stronger in countries with higher uncertainty avoidance scores ($\gamma_{12}=0.003$; $p<0.001$), which supports H2a. On the other hand, H2b, which proposes that the positive effect of production budget on performance is higher where uncertainty

avoidance is higher, is not supported ($\gamma_{21}=0.0004$; $p>.10$). The effects of star power ($\gamma_{31}=0.008$; $p<0.001$) and critics' reviews ($\gamma_{42}=0.011$; $p<0.001$) are reinforced in high uncertainty avoidance cultures, as hypothesized in H2c and H2d, respectively.

Consistent with H3a, the positive effect of sequels on box office performance is stronger in high power distance cultures than in low power distance cultures ($\gamma_{13}=0.005$; $p<0.05$). H3b proposes a positive moderation effect of power distance on the link between star power and opening weekend box office performance. Not only is this hypothesis not supported, but results also reveal that the positive effect of star power actually weakens ($\gamma_{32}=-0.017$; $p<0.001$) in cultures with high power distance.

We find that while the effect of sequels, as hypothesized in H4a, is stronger in "indulgent" cultures than in "restrained" cultures ($\gamma_{14}=0.006$; $p<0.001$); contrary to the expectations (i.e., H4b), the positive effect of budget weakens as culture gets more "indulgent" ($\gamma_{22}=-0.002$; $p<0.001$). Results show that indulgence versus restraint indeed reinforces the effects of star power ($\gamma_{33}=0.021$; $p<0.001$), supporting H4c. However, H4d, which proposes that critics' reviews are more important in indulgent cultures, is not supported ($\gamma_{43}=0.0005$; $p>.10$).

As hypothesized in H5a, H5b, and H5c, we find that the positive effects of sequel ($\gamma_{15}=0.003$; $p<0.001$), production budget ($\gamma_{23}=0.006$; $p<0.001$), and star power ($\gamma_{34}=0.005$; $p<0.05$) are stronger in "open" cultures. H5d proposes that the positive effect of critics' reviews is stronger in countries that score high on cultural openness. Our findings, however, do not support H5d ($\gamma_{44}=0.011$; $p>.10$).

While we do not hypothesize main effects for either movie- or country-level variables, we still include their effects for correct estimation of interaction effects involving those variables (Steenkamp and Geyskens 2006). Results show that the main effects of variables at both levels are in concordance with the extant literature. Consistent with Basuroy et al. (2006) and Hennig-Thurau et al. (2009), we find that for sequel movies, box office revenues are higher than for non-sequel movies ($\gamma_{10}=0.273$; $p<0.001$). Further, movies with bigger budgets ($\gamma_{20}=0.041$; $p<0.05$) and more star power ($\gamma_{30}=0.060$; $p<0.001$) perform better in their opening weekend. Results reveal a positive and significant relationship between critics' reviews and the opening weekend performance of a movie ($\gamma_{40}=0.055$; $p<0.001$).

Estimated main effects of country-level variables also reveal interesting findings. We find that opening weekend performance of movies tends to be higher in countries that score higher in the cultural dimensions of individualism ($\gamma_{01}=0.015$; $p<0.001$), uncertainty avoidance ($\gamma_{02}=0.010$; $p<0.001$), power distance ($\gamma_{03}=0.021$; $p<0.001$), and indulgence ($\gamma_{04}=0.015$; $p<0.001$). In a similar vein, cultural openness is also a significant and positive indicator of movie viewership among countries ($\gamma_{05}=0.062$; $p<0.05$).

Table 3 Descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum	
1	OPENREV _{ij}	1.7 × 10 ⁶	6.9 × 10 ⁶	70	169.2 × 10 ⁶
2	SEQUEL _i	0.123	0.329	0	1
3	BUDGET _i	55.7 × 10 ⁶	53.9 × 10 ⁶	2400	300 × 10 ⁶
4	STAR _i	3.2 × 10 ⁸	3.9 × 10 ⁸	0	3.3 × 10 ⁹
5	REVIEWS _i	53.675	16.953	1	100
6	IDV _j	59.921	23.937	12	91
7	UAI _j	64.966	21.536	23	104
8	PDI _j	46.716	18.875	11	94
9	IVR _j	56.263	17.146	29	100
10	OPENNESS _j	3.160	0.724	0	3.800
11	MAJOR_L _{ij}	0.539	0.498	0	1
12	WIDE _{ij}	0.522	0.500	0	1
13	CHRISTMAS _i	0.021	0.143	0	1
14	WINTER _i	0.278	0.448	0	1
15	SPRING _i	0.239	0.427	0	1
16	SUMMER _i	0.221	0.415	0	1
17	NSCREENS _{ij}	3.916	1.721	0	8.405
18	SCSHARE _{ij}	6.136	5.168	0	74.419
19	COMP_NEW _{ij}	5.638	3.192	1	26
20	COMP_ONG _{ij}	37.469	29.545	8	145
21	ADVERTISING _i	20.8 × 10 ⁶	13.6 × 10 ⁶	100	55.7 × 10 ⁶
22	ROMANCE _i	0.073	0.260	0	1
23	THRILLER _i	0.073	0.261	0	1
24	ACTION _i	0.187	0.390	0	1
25	DRAMA _i	0.217	0.412	0	1
26	COMEDY _i	0.189	0.391	0	1
27	AWARD _i	0.132	0.635	0	8
28	ENGLISH _j	0.259	0.438	0	1
39	SEATS _j	3.9 × 10 ⁵	3.8 × 10 ⁵	52 × 10 ³	8.1 × 10 ⁶
30	LMOVIES _j	26.835	22.244	7	91
31	POPULATION _j	5.4 × 10 ⁷	7.9 × 10 ⁷	3.3 × 10 ⁶	3.1 × 10 ⁸
32	TOTGDP _j	2 × 10 ¹²	3.7 × 10 ¹²	3.62 × 10 ¹⁰	1.4 × 10 ¹³

Total number of observations = 13,817

Regarding the control variables, results show that movies that are wide-released ($\gamma_{60}=0.015$; $p<0.05$) by major local distributors ($\gamma_{50}=0.051$; $p<0.001$) generate higher opening weekend revenues. In line with the previous studies, results show that movies released in winter perform better ($\gamma_{80}=0.081$; $p<0.001$), whereas movies released in spring perform worse ($\gamma_{90}=-0.061$; $p<0.05$), than those released in fall. Further, screen space during movie release is diagnostic of opening weekend revenues both in absolute ($\gamma_{110}=0.932$; $p<0.001$) and relative terms ($\gamma_{120}=0.061$; $p<0.001$). Not surprisingly, a negative relationship exists between the strength of competition and box office performance, such that competition from both new releases ($\gamma_{130}=-0.041$; $p<0.001$) and ongoing releases ($\gamma_{140}=-0.005$; $p<0.05$) decrease opening weekend revenues. Results show that more advertising leads to higher initial revenues ($\gamma_{150}=0.054$;

$p<0.001$) and that romance ($\gamma_{160}=0.162$; $p<0.001$) and action ($\gamma_{180}=0.072$; $p<0.05$) movies generate higher revenues, while comedies perform worse ($\gamma_{200}=-0.068$; $p<0.05$). Finally, awards indicate better opening weekend box office performance ($\gamma_{210}=0.129$; $p<0.001$).

At the country level, opening weekend revenues are higher in English-speaking countries ($\gamma_{06}=0.328$; $p<0.001$). We find that while the strength of the local movie industry is detrimental to box office performance ($\gamma_{08}=-0.086$; $p<0.001$), total number of cinema seats ($\gamma_{07}=0.111$; $p<0.10$) and population ($\gamma_{009}=0.455$; $p<0.05$) have positive effects on opening weekend revenues. Finally, movies earn more in their opening weekend in countries with higher total GDP ($\gamma_{010}=0.812$; $p<0.001$).

The relative effect sizes show that all of the movie-level signals except production budget (*BUDGET_i*) and all of the

Table 4 Movie- and country-level effects on opening weekend box office performance

Variable	Hypothesis	Coefficient	Standard error	Relative effect size
Intercept		12.090***	(0.105)	
Main effects				
<i>Movie level</i>				
SEQUEL _i (γ ₁₀)		0.273***	(0.039)	0.031
BUDGET _i (γ ₂₀)		0.041**	(0.019)	0.015
STAR _i (γ ₃₀)		0.060***	(0.007)	0.033
REVIEWS _i (γ ₄₀)		0.055***	(0.010)	0.029
<i>Country level</i>				
IDV _j (γ ₀₁)		0.015***	(0.005)	0.023
UAI _j (γ ₀₂)		0.010***	(0.003)	0.024
PDI _j (γ ₀₃)		0.021***	(0.005)	0.027
IVR _j (γ ₀₄)		0.015***	(0.005)	0.023
OPENNESS _j (γ ₀₅)		0.062**	(0.029)	0.018
Interactions				
IDV _j × SEQUEL _i (γ ₁₁)	H1a (−)	−0.004***	(0.001)	0.025
IDV _j × REVIEWS _i (γ ₄₁)	H1b (+)	0.005	(0.009)	0.004
UAI _j × SEQUEL _i (γ ₁₂)	H2a (+)	0.003***	(0.001)	0.021
UAI _j × BUDGET _i (γ ₂₁)	H2b (+)	0.0004	(0.0005)	0.006
UAI _j × STAR _i (γ ₃₁)	H2c (+)	0.008***	(0.002)	0.024
UAI _j × REVIEWS _i (γ ₄₂)	H2d (+)	0.011***	(0.002)	0.029
PDI _j × SEQUEL _i (γ ₁₃)	H3a (+)	0.005**	(0.002)	0.018
PDI _j × STAR _i (γ ₃₂)	H3b (+)	−0.017***	(0.004)	0.025
IVR _j × SEQUEL _i (γ ₁₄)	H4a (+)	0.006***	(0.001)	0.030
IVR _j × BUDGET _i (γ ₂₂)	H4b (+)	−0.002***	(0.0001)	0.037
IVR _j × STAR _i (γ ₃₃)	H4c (+)	0.021***	(0.006)	0.022
IVR _j × REVIEWS _i (γ ₄₃)	H4d (+)	0.0005	(0.0004)	0.010
OPENNESS _j × SEQUEL _i (γ ₁₅)	H5a (+)	0.003***	(0.0002)	0.036
OPENNESS _j × BUDGET _i (γ ₂₃)	H5b (+)	0.006***	(0.002)	0.020
OPENNESS _j × STAR _i (γ ₃₄)	H5c (+)	0.005**	(0.002)	0.018
OPENNESS _j × REVIEWS _i (γ ₄₄)	H5d (+)	0.011	(0.007)	0.012
Controls				
<i>Movie level</i>				
MAJOR _{L-ij} (γ ₅₀)		0.051***	(0.016)	0.020
WIDE _{ij} (γ ₆₀)		0.015**	(0.006)	0.017
CHRISTMAS _i (γ ₇₀)		0.008	(0.071)	0.001
WINTER _i (γ ₈₀)		0.081***	(0.022)	0.022
SPRING _i (γ ₉₀)		−0.061**	(0.027)	0.015
SUMMER _i (γ ₁₀₀)		0.016	(0.027)	0.004
NSCREEN _{ij} (γ ₁₁₀)		0.932***	(0.059)	0.036
SCSHARE _{ij} (γ ₁₂₀)		0.061***	(0.010)	0.029
COMP_NEW _{ij} (γ ₁₃₀)		−0.041***	(0.005)	0.032
COMP_ONG _{ij} (γ ₁₄₀)		−0.005**	(0.002)	0.017
ADVERTISING _i (γ ₁₅₀)		0.054***	(0.014)	0.023
ROMANCE _i (γ ₁₆₀)		0.162***	(0.037)	0.025
THRILLER _i (γ ₁₇₀)		0.012	(0.035)	0.003
ACTION _i (γ ₁₈₀)		0.072**	(0.029)	0.016
DRAMA _i (γ ₁₉₀)		−0.033	(0.038)	0.006
COMEDY _i (γ ₂₀₀)		−0.068**	(0.030)	0.015
AWARD _i (γ ₂₁₀)		0.129***	(0.013)	0.033

Table 4 (continued)

Variable	Hypothesis	Coefficient	Standard error	Relative effect size
<i>Country level</i>				
ENGLISH _j (γ ₀₆)		0.328***	(0.003)	0.038
SEATS _j (γ ₀₇)		0.111*	(0.060)	0.016
LMOVIES _j (γ ₀₈)		−0.086***	(0.020)	0.028
POPULATION _j (γ ₀₉)		0.455**	(0.208)	0.018
TOTGDP _j (γ ₀₁₀)		0.812***	(0.177)	0.028

***: $p < 0.001$ / **: $p < 0.05$ / *: $p < 0.10$. All p values except covariates are for one-sided hypothesis tests

country-level characteristics except cultural openness (*OPENNESS_j*) have higher effect sizes than average.⁵ Almost half of the interactions (i.e., $IDV_j * SEQUEL_i$, $UAI_j * STAR_i$, $UAI_j * REVIEWS_i$, $PDI_j * STAR_i$, $IVR_j * SEQUEL_i$, $IVR_j * BUDGET_i$, $OPENNESS_j * SEQUEL_i$) have stronger impact than average on the opening weekend box office revenue, whereas the magnitude of the effects of $IDV_j * REVIEWS_i$, $UAI_j * BUDGET_i$, $IVR_j * REVIEWS_i$, and $OPENNESS_j * REVIEWS_i$ are well below average. Among the movie-level control variables, the effects of *NSCREEN-S_{ij}*, *COMP_NEW_{ij}*, and *AWARD_i* as well as the country-level controls *ENGLISH_j*, *LMOVIES_j*, and *TOTGDP_j* have stronger relative effects.

Country-specific parameter estimates

Table 5 demonstrates how the effects of movie-level variables on opening weekend box office performance vary across countries. Similar to multi-country model, country-by-country estimations reveal that the empirical model fits the data well with adjusted R² values ranging from 0.72 to 0.95 across countries. While the country-specific intercepts are positive and statistically significant for all countries, the magnitude varies across countries. For example, while the estimated average box office revenues are highest for Japan ($\beta = 8.805, p < .001$), Finland ($\beta = 7.757, p < .001$), and South Africa ($\beta = 7.523, p < .001$), they are the lowest for Taiwan ($\beta = 3.113, p < .001$), Czech Republic ($\beta = 4.837, p < .001$), and Hungary ($\beta = 5.203, p < .001$). A lower value of intercept implies that the observed predictors play a larger role in determining movie viewership in these countries. For instance, the number of screens is one of the most important predictors of opening weekend box office performance with the highest impact in the Netherlands ($\beta = 1.451, p < .001$) and Israel ($\beta = 1.442, p < .001$) and the lowest in the Czech Republic ($\beta = .359, p < .001$) and the United States ($\beta = .617, p < .001$). Along with the number of screens; screen share, sequels, star power, and critics’ reviews appear as important drivers of opening weekend box office performance. Further, similar to

Elberse and Eliashberg (2003) and Basuroy et al. (2006), we find that competition is a potent impediment to successful box office performance. In particular, competition from new movies seems like a greater threat, as its negative effects are statistically significant in most countries in the dataset.

Country-specific parameter estimates show also some parallelism with the findings in Table 3. In particular, star power has the highest impact in countries like France ($\beta = .027, p < .001$), Poland ($\beta = .023, p < .001$), Uruguay ($\beta = .023, p < .001$), and Venezuela ($\beta = .020, p < .001$)—all of which score highly on uncertainty avoidance, indulgence, and cultural openness. Similar to star power, sequels appear to be a more critical signal of movie performance in high uncertainty avoidance and collectivist cultures like Chile ($\beta = .685, p < .001$), Taiwan ($\beta = .654, p < .001$), and Portugal ($\beta = .529, p < .001$). Regarding critics’ reviews, country specific results still support earlier findings. Specifically, we find that viewers in high uncertainty avoidance (e.g., France, Japan) cultures consider expert reviews more seriously.

Model fit and diagnostics

To understand the model fit, we refer to a common fit statistic: $-2\log\text{likelihood}$ ($-2LL$), generated in the full maximum likelihood estimation (Raudenbush et al. 2004). $-2LL$, also known as the “deviance statistic,” decreases as the overall model fit improves. Differences in the deviance statistic between models follow a chi-square (χ^2) distribution, with degrees of freedom equal to the difference in the number of parameters estimated between models. In Table 6, Model 1 includes only the intercept term, indicating the average opening weekend box office revenue of all movies across all countries. Model 2 includes movie- and country-level main effects (e.g., movie characteristics, cultural variables, and control variables), and Model 3 includes interactions, hence representing the full model. Expectedly, results show that while Model 2 fits the data better than Model 1 ($\Delta -2LL = 17,337.2; p < 0.001$), Model 3 has a better overall fit than Model 2 ($\Delta -2LL = 9,819.1; p < 0.001$)

Table 6 also shows that when the models include movie- and country-level variables as well as their interactions, the

⁵ With 47 parameter estimates, the average relative effect size is 0.021.

Table 5 Country specific movie-level parameter estimates

Variable	Australia	Austria	Chile	Czech Rep.	Denmark	Finland	France	Germany	Hungary	Israel	Japan	S. Korea	Netherlands	N. Zealand
SEQUEL _i	.115*	.350***	.654***	.347***	.474***	.259***	.234***	.440***	.345***	.275***	.098*	.131*	.375***	.331***
BUDGET _i	.021	.016	.004	.225***	.058	.016	.073**	.023	.081**	.004	.050	.012	.027	.032
STAR _i	.016**	.011**	.018**	.014**	.012**	.010**	.027***	.015*	.016**	.024***	.014*	.011**	.010*	.010*
REVIEWS _i	.133***	.054*	.043*	.122***	.062**	.073**	.159***	.091***	.087***	.102**	.132***	.046*	.133***	.030
MAJOR_L _{ij}	.174***	-.006	.339***	-.169*	.015	.124**	-.011	-.145**	.036	.412*	-.090	.085	.324***	.243***
WIDE _{ij}	.276***	.213**	.485***	.382***	-.051	.006	.017	.105	-.351***	-.171	.306***	.126	-.049	.120
CHRISTMAS _i	.283*	-.130	.090	-.666**	.646***	.087	-.329*	-.176	.406**	-.334	-.357	.463**	-.107	-.594***
WINTER _i	.084	.256***	.163**	-.160	.034	.149*	.046	.123*	.164*	-.144	.063	.198**	.080	.021
SPRING _i	-.039	-.075	.204***	-.190*	-.113	-.234***	.010	-.147**	.073	-.214	-.038	-.106	-.118	.079
SUMMER _i	-.124	.006	.245***	-.189*	-.126	-.108	-.141**	-.070	.292***	-.140	.194**	.171**	.057	.044
NSCREEN _{ij}	.913***	1.203***	.782***	.359**	1.027***	.642***	1.218***	1.106***	1.130***	1.442***	.721***	.930***	1.451***	.853***
SCSHARE _{ij}	.082***	.040**	.032***	.101***	.002	.063***	.062***	.082***	.072***	-.014	.092***	.078***	-.052***	.089***
COMP_NEW _{ij}	-.009	-.039***	-.095***	-.083***	-.098***	-.008	-.029**	-.042***	-.014*	-.128**	.002	-.013	-.065***	-.075***
COMP_ONG _{ij}	-.005**	.003	-.005	.014	-.006	-.001	.004*	.002**	.014	.015	-.004	.009***	-.014	.003
ADVERTISING _i	.022	.051**	.073**	.105***	.035	.046*	.007	.050**	.068***	-.025	.014	.084***	.047**	.065***
ROMANCE _i	.178	.261**	.080	.207	.317**	.438***	.112	.154	.229**	.486**	.030	-.094	.305***	.276**
THRILLER _i	.052	.058	-.035	-.064	-.070	.227	.064	-.063	.090	.141	.154	.067	.364***	-.154
ACTION _i	.117	.197**	-.093	-.125	.231**	.310***	-.028	.065	-.014	.322**	.119	-.138*	.314***	.214***
DRAMA _i	-.012	.100	-.009	-.107	-.063	.078	-.030	.017	.044	.030	.014	-.217**	.142*	-.080
COMEDY _i	.125	.202**	-.082	-.146	-.077	.131	-.104	.128*	.174*	.286**	.168	-.354***	.122	-.021
AWARD _i	.120***	.199***	.065*	.160***	.200***	.184***	.102**	.152***	.076*	.173*	.145***	.052	.192***	.205***
Intercept	7.506***	6.253***	7.462***	4.837***	7.426***	7.757***	7.212***	6.022***	5.203***	6.735***	8.805***	6.157***	6.592***	6.737***
Adjusted-R ²	.86	.82	.86	.77	.82	.77	.89	.86	.76	.72	.88	.91	.83	.81

Table 5 (continued)

Variable	Norway	Philippines	Poland	Portugal	S. Africa	Spain	Sweden	Switzerland	Taiwan	UK	USA	Uruguay	Venezuela
SEQUEL _i	.405***	.251***	.339***	.529***	.195***	.144***	.135*	.159*	.685***	.394***	.107*	.082*	.022*
BUDGET _i	.032	.124***	.067*	.032	.013	.009	.043	.108**	.440***	.012	.032	.056	.118***
STAR _i	.015**	.010**	.023***	.012**	.015**	.016***	.011**	.019***	.014**	.011*	.015**	.023***	.020***
REVIEWS _i	.118***	.048*	.051*	.043**	.005	.062***	.089***	.062*	.004	.150***	.166***	.012	.025
MAJOR_L _{ij}	.195***	.004	-.112*	.107**	-.055	.068	-.165**	-.127	.180*	-.016	.119**	.261***	-.047
WIDE _{ij}	-.167	.147	.170*	.039	.009	.114	-.085	-.299**	.871***	-.393***	-.069	.027	.089
CHRISTMAS _i	.275	.030***	-.637***	.216	.029	.130	-.025	-.115	.173	.426*	.120	-.615**	.446**
WINTER _i	-.007	-.129*	.054	.105*	.155**	.052	.048	.085	.099	.379***	.125	.189**	-.048
SPRING _i	-.224***	.066	-.302***	-.160***	.091	-.153**	-.273***	-.346***	.073	.023	-.019	.240***	.020
SUMMER _i	-.042	.036	-.081	.016	.045	-.132**	-.135	-.119	.251*	.108	.043	.303***	.131*
NSCREEN _{ij}	.885***	.806***	.875***	1.060***	.845***	1.179***	1.081***	.988***	.712***	1.069***	.617***	1.097***	1.030***
SCSHARE _{ij}	.055***	.031***	.076***	.058***	.125***	.071***	.037***	.042***	.025**	.215***	.178***	.036*	.021**
COMP_NEW _{ij}	-.025*	-.074***	-.050**	.005	-.057***	-.020	-.034**	-.063**	-.059*	-.026***	-.025***	-.063***	.010
COMP_ONG _{ij}	.008*	.017**	.015*	.002	-.025***	.001	.002	-.003	.045***	.006***	.002	.011	.023***
ADVERTISING _i	.085***	.122***	.037	.037**	.044***	.003	.052**	-.001	.293***	-.029	.237***	-.043*	.017
ROMANCE _i	.348***	-.052	.031	.166*	.369***	.137	-.017	.429**	-.159	.035	.082	.462***	-.175*
THRILLER _i	.117	-.206*	.033	.169*	-.136	.118	-.005	.177	-.327*	-.154	-.131	.128	-.120
ACTION _i	.253***	-.136*	-.073	.021	.009	.026	.195**	.081	.115	-.027	.096	-.004	-.112*
DRAMA _i	.058	-.309***	-.080	.146**	-.005	.180***	.044	.247**	-.714***	-.130	-.013	.061	-.278***
COMEDY _i	.035	-.397***	-.069	.079	.090	.004	-.078	.108	-.738***	-.030	.016	.135	-.076
AWARD _i	.118***	.001	.146***	.051	.168***	.092**	.109**	.000	.186**	.170***	.164***	.138***	.070**
Intercept	6.087***	6.512***	6.593***	6.497***	7.523***	6.585***	7.467***	7.367***	3.113***	6.171***	6.560***	6.738***	6.244***
Adjusted-R²	.82	.84	.72	.88	.88	.89	.82	.82	.74	.88	.95	.77	.86

***: $p < 0.001$ / **: $p < 0.05$ / *: $p < 0.10$. All p values except covariates are for one-sided hypothesis tests

Table 6 Model fit and diagnostics

	Model 1 (unconditional model)	Model 2 (model without interactions)	Model 3 (full model)
Variance components			
Movie-level (σ^2)	1.24	0.96	0.28
Country-level (τ_{qq})	2.22	1.23	0.37
Model fit			
Deviance “-2LL”	54,004.8	36,667.6	26,848.5
Δ -2LL		17,337.2***	9,819.1***

***. $p < 0.001$

variation in movie and country levels decreases significantly. In Model 3, with the inclusion of the cross-level interactions, the variance within countries decreases to 0.28 and between countries decreases to 0.37. This model diagnostic shows that the variables included in the hierarchical system explain 77% (i.e., $(1.24 - 0.28) / 1.24$) of the variance at the movie level and 83% (i.e., $(2.22 - 0.37) / 2.22$) of the variance at the country level (Bryk and Raudenbush 1992; Snijders and Bosker 1999).

Discussion

Consumers face uncertainty in evaluating the quality of a movie before they see it and have a short window in making informed decisions. Therefore, studios emit marketing signals about the quality of a movie to reduce prospective moviegoers' uncertainty and to boost box office revenues. However, there can be substantial differences in the use and interpretation of same movie signals by audiences from different cultures. Despite its well-established role in affecting consumption patterns, impact of culture has received relatively little attention in the motion picture literature. This study attempts to address this gap by examining how cultural milieu moderates the effects of movie-related signals on the opening weekend box office performance in a cross-national context. That said, the findings of this study are also applicable to a wide range of industries including intangible and experiential goods laden with cultural cues, the qualities of which are difficult to evaluate prior to consumption, such as performing arts and book publishing (Lampel and Shamsie 2000). In general, we find support for the relevance of cultural milieu in understanding the effects of marketing signals on product performance. Below, we discuss the theoretical and managerial implications of the findings as they offer further insights into the variations in the market performances of products across cultures.

Regarding sequels and culture, this study extends the findings of previous studies conducted in a U.S. setting by demonstrating that the positive relationship between sequels and box office revenues persists internationally, while also documenting how this relationship varies by culture. First, our results show that moviegoers in individualist cultures do not

utilize sequels as a key signal of movie quality as much as the audiences in collectivist cultures do. Given the emphasis of individualist cultures on personal freedom of choice, experience, and self-expression, it is not unexpected that the impact of sequels as indicators of people's appreciation and choice of a previous movie—and thus a signal of group behavior—is lower in such cultures. Second, we find that moviegoers in high uncertainty avoidance cultures are more likely to utilize sequels as a signal of movie quality since they are more averse to ambiguity. Third, findings show that in high power distance cultures, the opening weekend box office revenues of sequels are higher than those of non-sequels. High power distance cultures emphasize prestige and wealth in shaping relationships between social and economic classes. They attribute more importance to successful products and well-known brand names than consumers in low power distance cultures (Erdem et al. 2006). Hence, it is not unexpected that a sequel, signaling better quality and success, is likely to increase revenues in high power distance cultures. Further, signaling effects of sequels are stronger for moviegoers in high indulgence and open cultures. Both of these cultural traits are inherently associated with interest in, and curiosity about, foreign cultures and more positive attitude toward foreign entertainment. As such, people in these cultures are more likely to search for and process signals about the quality of the cultural work in which they will invest their time and money. Sequels, as outcomes of successful movies of the past, cogently indicate better quality, and thus moviegoers in these cultures will be more interested in them.

Regarding the production budget and culture, while our results, similar to those of previous studies conducted in the U.S. market, show that a movie's production budget positively affects the opening weekend box office revenues in international markets; we find interesting moderation effects that warrant further elaboration. Contrary to our hypothesis, the effect of production budget as a signal of movie quality on box office revenues does not increase with uncertainty avoidance. Cultures that score high in uncertainty avoidance are, in fact, well-documented to utilize as much information as possible to eschew ambiguity; hence, they are expected to be sensitive to production budget. We attribute this interesting finding to two major factors: (1) with the exception of avid

enthusiasts, most moviegoers might simply be unaware of the production budget and/or (2) other signals might render that information unnecessary. Production costs of a movie are, in general, not overtly advertised. Instead, that information is disseminated indirectly through PR activities (e.g., press releases and interviews with the cast or production team) and it might be difficult for someone in a foreign, especially a non-English speaking, country to know about the production budget since most of those activities take place in the U.S. and in English.

Besides, other signals more obvious to moviegoers might act as a proxy, or even eclipse the effects of production budget. Star power, in particular, might be a much stronger signal of quality as it is much costlier to cast more famous stars. For instance, almost half of the production budget (i.e., \$100 million) of *The Tourist* was paid to Johnny Depp and Angelina Jolie. Second, stars want to improve their reputation and are more likely to act in movies that are expected to be successful than in other movies that might damage their stardom. We also find that effects of production budget decrease in indulgent cultures. The majority of the production cost of a movie is spent on its special effects, famous actors, and marketing. Moviegoers in such cultures might be more interested in other factors like the plot and its presentation throughout the movie. They might even regard big production movies that have ample special effects, feature famous actors, and are advertised heavily to be “simple” or even maybe “too mainstream” for their taste. The only positive—as hypothesized—moderator of the relationship is cultural openness, which suggests that moviegoers in more cosmopolitan cultures regard sizeable financial investment in a movie as a more credible signal of its quality.

Regarding the star power and culture, in tandem with previous studies conducted in the U.S. market, we find that the positive link between box office performance of a movie and its star power is still instrumental in other countries. We extend this research stream by showing that the impact of star power is even stronger in countries with high uncertainty avoidance, indulgence, and cultural openness. The positive moderation effect of uncertainty avoidance is associated with the higher needs of consumers for further information to pre-evaluate movie quality. Besides, since they are less concerned with the cost of information search, they might spend more time in gathering and processing information about the actors and actresses in a movie. On the other hand, we find that high power distance decreases the effect of star power on a movie’s performance. Despite the emphasis on prestige and wealth in defining relationships between social classes, and the acceptance of power inequality, people in these cultures also tend to distrust authority and status because they regard inequality to be coercive rather than legitimate in nature (Dawar et al. 1996). In indulgent and open cultures, people are more receptive to foreign forms of

entertainment, especially movies and, hence, popular actors and actresses.

Regarding critics’ reviews and culture, we find that critics’ reviews are more instrumental in high uncertainty avoidance cultures characterized by a low tolerance for uncertainty, risk, and ambiguity. Thus, consumers from such cultures seek and collect as much information as possible in order to make the “right” decision, which corroborates the findings of studies on the use of reviews, referrals, and recommendations from third party sources in high uncertainty avoidance cultures (e.g., Money et al. 1998). On the other hand, findings also reveal that the impact of critics’ reviews does not significantly increase with higher individualism, indulgence, or cultural openness. People in individualist cultures tend to utilize formal and “out-group” sources of information such as examining websites, reading expert reviews or looking for the existence of third party certifications; whereas people in collectivist cultures rely on informal and “in-group” information exchange such as resorting to the opinions of immediate family members, peers, and coworkers. Yet, moviegoers from individualist countries might find local expert reviews reflecting their own attitudes, values, and tastes better; thus, they are more interested in the opinions of local critics than a U.S.-based source similar to the one adopted in this research. While the same reasoning might be valid for the insignificant results in cultures with high indulgence and openness, it is also a valid future research avenue to examine interaction effects of these cultural dimensions with other types of third party reviews such as consumer reviews, ratings, and word-of-mouth (e.g., Chen and Xie 2005; Liu 2006).

When it comes to the movie- and country-level control variables, our results extend the findings of the studies conducted in the U.S. context (e.g., Basuroy et al. 2006; Joshi and Hanssens 2009) and corroborate the results of those conducted with international data (e.g., Eliashberg et al. 2006; Leenders and Eliashberg 2011; Neelamegham and Chintagunta 1999).

Managerial implications

Marketing is a very relevant field for the use of various signals to decrease information asymmetry between firms and consumers. This study posits that there are important differences, driven by cultural variations, in the effectiveness of signals on product performance (Dawar and Parker 1994). Findings have several important implications for the global motion picture industry, as they shed light on how signaling strategies can be modified from one country to another to increase box office revenues.

Returns on studios’ efforts to successfully launch a movie across countries depend on cultural traits of a country. For instance, in countries like South Korea, Uruguay, and Venezuela where uncertainty avoidance is high, studios need to

focus more on advertising sequels and star power. In particular, emphasizing sequels can be effective in societies where consumers are risk averse and thus may consider sequels as indicators of previous success. Sequels have stronger effects on box office performance in highly collectivist societies such as Taiwan and Chile, where consumers are in stronger need to strengthen their bond to a group; sequels, indicating a “group” preference in the past, can reinforce this need. On the other hand, in high power distance cultures, studios need to tone down efforts for signaling movie quality via the famous cast while still emphasizing sequels. In such cultures, greater distrust of authority seems to have a detrimental impact on the effect of star power, counterbalancing the stronger positive impact of the relationship between star presence in the cast of a movie and its performance. That said, in high indulgence and open cultures (e.g., Australia, Denmark, and the Netherlands), star power is an important signal as it influences moviegoers’ perception of the movie quality.

In motion picture industry, independent third party “info-mediaries” play a key role in helping consumers decrease uncertainties about movie quality, which can help a movie gain box office momentum in the opening weekend. In high uncertainty avoidance cultures, studios need to incorporate expert reviews and critics’ opinions into their marketing efforts by integrating ratings or reviews that a movie receives in their advertisements, or by inserting a critic’s opinion on the poster or trailer of a movie since consumers in such cultures are more attentive to third party information. Although third party reviews are essential to reduce consumers’ uncertainty, in individualist and indulgent cultures, moviegoers might be more interested in local reviews than in U.S.-based ratings. In such cultures, the studios should not only place more emphasis on local reviews and ratings to better persuade the local audience but also take into account other customers’ reviews and follow up with necessary social media and websites to keep track of word-of-mouth among moviegoers about the movie.

Furthermore, it might be rewarding for studios to collaborate with major local distributors in the countries they target. Major local distributors with superior knowledge about the local market—as well as business networks with movie theaters and media personalities—can better market a foreign movie. Studios should also take into account the competition when launching movies in international markets since other new movies launched in the same week as well as movies launched in previous weeks might have detrimental effects on a movie’s revenues. Between these two types of competition, studios need to be more concerned about the competition from new entrants than that from ongoing movies as the former has a greater deteriorating effect.

⁶ In 2011, international box office revenues surged 7% to \$22.4 billion, more than double the North American receipts, which fell 4% to \$10.2 billion (MPAA 2011).

As the revenues from international markets have become exceedingly vital for the bottom lines of the studios,⁶ customizing signaling strategies across countries can be highly valuable for the box office performance of a U.S. movie. Overall, by carefully adjusting the marketing and communication strategy of movie signals with regard to the cultural fabric of the target country, producers and studios are likely to increase their success in international markets.

Limitations and future research

This study has some limitations that offer opportunities for further research. First, the dataset, focusing on movies produced in or co-produced with the United States, represents the dominant position of Hollywood movies in the world (Leenders and Eliashberg 2011). However, future research might include movies from other countries. Second, due to the high number of movies included in our analysis, it is not possible to conduct a more detailed analysis of cultural features within movies. Hence, a potential area for future research can be a more detailed examination (e.g., using content analysis) of how the cultural cues of a movie are perceived across cultures. Finally, due to the variety of languages spoken in the countries included in the dataset, it is not possible to collect data on local critics’ reviews. However, as local reviews might reflect the tastes, values, and attitudes of movie viewers in a particular country, analysis of their impact might be an interesting future research avenue. Its limitations notwithstanding, we believe this study provides an important and relevant explanation of culture’s effects on the link between movie signals and box office performance. We hope that these findings will stimulate further research in this important area as managers continue seeking ways to develop and execute culture-sensitive product management strategies in the global marketplace.

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