Media trade beyond country borders: five types of global cinema distribution

Vejune Zemaityte,[1] Bronwyn Coate,[2] and Deb Verhoeven[3]

1 June 2018

Abstract While international cinema trade has been studied extensively, no work to date has examined global distribution beyond country borders. Instead of exploring media flows from production origins to importing markets, this paper analyses the shape of each film's global theatrical run, combining information from 40 countries. The run is characterised by three main factors: the number of global screenings, the geographical spread, and the global duration in theatres. With the aid of cluster analysis, five types of distribution are identified based on the three proposed factors. The paper explores similarities and differences across the clusters using multiple regression analysis to model the relationship between global exposure in terms of screenings and movie, distribution, and origin characteristics. Results show notable distinctions between the segments with only the number of countries visited and documentary genre being uniform across clusters. This paper uses a dataset of 3,424 films from 124 origins that are released in at least two out of 40 countries included within the sample derived from the Kinomatics Global Showtime database. The unique contribution of this paper is in that it covers multiple areas to provide insight into cinema as a global market based on detailed screening-level observations constituting over 130 million showtimes.

Keywords big data, film distribution, global media trade, clusters, movie industry, cinema
JEL Classification L82, Z10

[1] **Deakin University, Geelong, Australia**
School of Communication and Creative Arts, Faculty of Arts and Education
221 Burwood Highway, Burwood VIC 3125, Australia
vzemaity@deakin.edu.au
ORCID: 0000-0001-9714-7903
[2] **RMIT University, Melbourne, Australia**
School of Economics, Finance & Marketing,
11/445 Swanston Street, Melbourne Victoria 3001, Australia
bronwyn.coate@rmit.edu.au
ORCID: 0000-0002-9148-3751
[3] **University of Technology Sydney (UTS), Sydney, Australia**
Faculty of Arts and Social Sciences
15 Broadway, Ultimo New South Wales 2007, Australia
deb.verhoeven@uts.edu.au
ORCID: 0000-0003-3680-3561

1 Introduction

In the introduction to the issue of the Journal of Cultural Economics dedicated to motion picture industry, Chisholm et al. (2015, p.8) state that "local markets are less and less relevant, and even if we are interested only in the big screen, we need to take a global perspective." In response to their claim, the focus of this paper shifts from media exchange among national markets to global cinema distribution. The screening records of 3,424 internationally released movies from 124 origins are examined in a global market comprising 40 countries during 2012-2015 to discuss the types of contemporary film circulation. This paper is the first attempt to measure global distribution trends that transcend country borders, using an extensive sample of all internationally distributed films regardless of their box office earnings with the focus instead given to their level of screenings.

Relying on theatrical screening information from the Kinomatics Global Showtime database,[4] this article measures global cinema distribution at a film-level by the number of screenings, the geographical spread, and the length of the theatrical run. These variables are first used to segment the sample into distinct groups reflecting five types of international cinema circulation through cluster analysis. The types are described and theorised. Then the additional movie, distribution, and origin characteristics together with the geographical spread are incorporated into five multiple regression models of the same composition for each identified segment to test for quantifiable differences across the groups. It is concluded that the proposed split is meaningful. Finally, observable factors that determine global exposure for internationally released films of each type are investigated through the same modelling.

The article begins with discussing the relevant literature on the international movie trade in Section 2. Then, Section 3 presents the dataset and variables. The methodology is outlined in Section 4. After that, Section 5 examines and describes the results from cluster and regression analyses. Finally, concluding remarks are made, and the learnings are summarised in Section 6.

2 Literature review

International cinema trade has been studied extensively. Many earlier empirical studies have focused on Hollywood productions and the one-way flow from the US to the rest of the

[4] See "Data and technology." Kinomatics at http://kinomatics.com/about/data-and-technology/.

world, often testing the cultural discount theory proposed by Hoskins and Mirus (1988), as well as home market and language effects. However, recent accounts have also examined the global movement of movies from other origins, allowing for a more complex picture of multiple, interacting media flows. Nonetheless, no work to date has moved beyond country borders to examine cinema distribution in a global market.

Previous empirical literature can be broadly divided into country-level and film-level investigations based on the amount of detail in the samples. While the macro analyses often span across many areas, the lack of richness in detail is a limitation in many of these studies. In contrast, the sample selection bias is the drawback of many micro investigations that focus on high grossing movies (i.e. Craig et al. 2005; Elberse & Eliashberg 2003; Lee 2006a, 2006b, 2008, 2009; Waterman 2005), with an exception of few recent projects that also include unsuccessful films (Alaveras et al. 2018; Kim & Jensen, 2014). This paper addresses both of these limitations as it collects data from 40 geographical areas at a granular screening level as well as records information for all films that fit the selection criteria regardless of their box office revenue.

Research on international movie trade can also be grouped around the following broad themes with regards to the subject matter. First, there are studies that focus solely on the performance of American films in foreign markets (Akdeniz & Talay 2013; Chan-Olmsted et al. 2008; Craig et al. 2005; Elberse & Eliashberg 2003; Fu 2013; Fu & Govindaraju 2010; Holloway 2013; Lee 2006a, 2006b, 2008, 2009; Leenders & Eliashberg 2011; McKenzie 2009; Meloni et al. 2018; Song & Shankar 2012; Walls & McKenzie 2012; Waterman 2005; Xu & Fu 2014; Zemaityte et al. 2018). Second, there are analyses of the performance of American movies in relation to the performance of domestic productions in foreign countries (Hanson & Xiang 2008, 2009, 2011; Jayakar & Waterman 2000; Kim 2004; Lee 2002; Lee & Waterman 2007; Walls 1997, 1998, 2009; Waterman & Jayakar 2000). Third, there are investigations of the origin diversity of imports in certain markets (Coate et al. 2017; Cucco 2010; Fu & Lee 2008; Masood 2015; McKenzie & Walls 2012; Moon et al. 2014; Moreau & Peltier 2004; Park 2014; Volz et al. 2010). Finally, there are examinations of the global cinema trade among multiple countries (Alaveras et al. 2018; Chung 2011; Coate et al. 2016; Fu 2006; Fu & Sim 2010; Kim & Jensen 2014; Lee & Bae 2004; Marvasti 1994, 2000; Marvasti & Canterbery 2005; Oh 2001).

The last group of studies that focus on the global cinema trade among multiple markets are thematically closest to this paper. The majority of these investigations are performed at a macro level. The early country-level analyses include many trading countries,

although they study the home market effect focusing only on the summed value of exports without considering the trade partners (Marvasti 1994, 2000; Marvasti & Canterbery 2005). Later macro studies examine the self-sufficiency ratio expressed in the share of the domestic box office in around 20 countries, but without taking into account the origins of imports (Lee & Bae 2004; Oh 2001). Further country-level studies differentiate among nine sources exporting to 94 countries (Fu 2006; Fu & Sim 2010). The two most recent macro examinations model the global trade as a relational network and include more exporting markets: 181 (Chung 2011) and 42 (Coate et al. 2016). However, only two papers investigate multilateral cinema trade at a film-level, both primarily focusing on Europe. Kim and Jensen (2014) study the exchange of movies from 19 European origins among 32 European markets, while Alaveras et al. (2018) examine the international flow across 27 European exporting and importing countries and also the US. Although this group of papers presents the fullest and most complex picture of the global cinema trade, detailed micro studies spanning across multiple Western and non-Western regions are lacking. This article not only analyses films from 124 origins that are screened across 40 countries but also evaluates their global distribution beyond country borders.

To explore the global patterns of film circulation, this paper also moves from the often employed box office receipts and focuses on three global distribution parameters instead: the number of screenings, the geographical spread, and the length of the theatrical run. None of these measures has been widely researched. Only five studies to date that all sample the Kinomatics database include the number of screenings. Arrowsmith et al. (2014) track the showtimes of the first two parts of *The Hobbit* (2012, 2013) across 48 countries to examine the international adoption of the high frame-rate technology. Differentiating between domestic and foreign showtimes among other measures of success for Australian films, Verhoeven et al. (2015) propose a film impact rating (FIR) as more finesse measure of movie popularity. Coate et al. (2016) use the volume of screenings to weight the multilateral exchange among countries. The number of showtimes is also employed as a measure of exposure diversity in Australian cinemas (Coate et al. 2017). Finally, the performance of American films is contrasted between their domestic market and Australia in terms of the volume of screenings (Zemaityte et al. 2018). It comes as no surprise that the variable has rarely been employed because the availability of detailed showtime information is limited. However, a more aggregate measure of supply, the number of screens, has been used extensively (i.e. McKenzie 2009; Song & Shankar 2012).

The geographical spread has also been rarely researched and, to my current knowledge, is only included in two studies. Song and Shankar (2012) find that the number of countries in which a film is released before travelling to a new market significantly increases its delay. Also, Verhoeven et al. (2015) include the number of countries visited into FIR.

The length of the theatrical run has attracted more scholarly attention. However, it has never been measured at a global or even regional level or compared across markets. While three studies model movie survival at a theatre level (Chisholm & Norman 2006; Fu 2009; and Legoux et al. 2015), the country-level analyses are closer to the approach employed in this paper. Sochay (1994) and later Chang and Ki (2005) compare the length of run and earnings as measures of domestic performance for American films. De Vany and Walls (1997) study the factors that determine movie survival in the US. Walls (1997, 1998) compares duration in theatres of Chinese and English movies in Hong Kong and finds that higher revenues and English language extend runs. In contrast, Moon et al. (2014) conclude that domestic films survive longer in South Korea. Nelson et al. (2001) and Deuchert et al. (2005) investigate the effect of Academy Awards nominations and wins on the life in American theatres. Waterman (2005) finds no relationship between the length of run and the date of video release in the US. Later studies examine the determinants of survival in foreign markets: Australia (McKenzie 2009), the UK (Izquierdo Sanchez 2014), and Italy (Ciciretti et al. 2015).

To contextualise the detected distribution patterns and test what determines global exposure, this paper also includes previously researched movie, distribution, and production origin characteristics. Only film-level drivers are considered due to working with global and not country-level data. The first examined movie characteristic, the running time, is used as an alternative measure of film quality and a proxy for the budget, following the research by Moon et al. (2010), who find that longer features receive higher ratings. A proxy has to be used because such information is not available for low earning movies, especially those produced outside the US that comprise the majority of the sample.

Genre is included as a second movie characteristic following the research into international cinema trade in relation to cultural discount (Fu 2013; Lee 2006a, 2006b; Volz et al. 2010; Waterman 2005). This paper cannot account for the effects of cultural distance between markets, market size, or language that are often included in this type of arguments because again the observations are not recorded at a country-level. However, the previously tested hypotheses about the transferability of certain genres due to cultural specificity are expected to hold in the current setting. Thus, the genres that are less culture-dependent such

as action/adventure, animation, horror, and suspense/thriller are expected to receive higher global exposure. In contrast, genres that are more culturally specific such as comedy and drama are predicted to be screened less internationally. While documentary and live event genres have not been previously categorised based on their cultural specificity, they are expected to receive lower global exposure due to targeting niche audiences.

The size of the distribution company is considered as a first distribution attribute, differentiating among major, mini-major, and independent distributors. Most of the previous studies find that being distributed by a major has a positive impact on performance expressed in total revenues (Kim & Jensen 2014; Litman 1983; Litman & Kohl 1989; Prieto-Rodriguez et al. 2014), earnings on the opening weekend (Akdeniz & Talay 2013), or the number of opening screens (Elberse & Eliashberg 2003). However, only two previous investigations include the mini-major category (Litman & Kohl 1989; Zemaityte et al. 2018). Nonetheless, it is expected that both major and min-major distributors have a positive impact on global exposure.

The season of release is included as a second distribution measure based on the first recorded showtime in the dataset. Following the research by Einav (2007, 2009), the releases are grouped into four periods: holiday, winter/spring, summer, and fall. Films opening during the 'high' seasons, holiday and summer, are expected to receive more global exposure, while the opposite is expected from movies opening in the 'low' seasons, winter/spring and fall.

The first measure of origin is whether a film is co-produced. Alaveras et al. (2018) hypothesise that co-productions are better available internationally due to their cultural and commercial roots in multiple countries. Further, Kim and Jensen (2014) see co-produced films as less culturally specific because they attune to tastes of audiences from all co-producing countries. Therefore, co-productions are expected to receive higher global exposure.

Finally, the origin information is also recorded in specific production countries. Only American films are expected to have better global exposure as the dominance of the US in the global cinema market has been established in the previous research (Hanson & Xiang 2011; Marvasti & Canterbery 2005; Waterman 2005). However, no expectations are formed with regards to other origins. Even though it is known that countries with strong domestic industries such as India or South Korea are highly self-sufficient (Waterman 2005), the previous research has not proven their dominance in the global market.

3 Data

The primary data source for this paper is the Kinomatics Global Showtime database that contains information on screenings, cinemas, and movies for all showtimes of all films in all cinema venues in 48 countries spanning 2.5 years. It registers information on formal theatrical distribution but does not track other types of viewing such as DVD, streaming, or illegal downloading. The time frame for this paper reflects the start and end points of the database, from 1 December 2012 to 1 June 2015. During this 30-month period, information on over 338 million screenings for over 96,000 movies in over 33,000 venues in 48 countries is collected. The Internet Movie Database (IMDb – http://www.imdb.com/) is used as a supplementary source for origin and release date information.

To study the global cinema distribution, 3,424 feature films[5] from 124 origins are selected from the database. Only the movies released in the first 13 months of the data collection are included so that each feature could be tracked for at least 17 months, capturing the whole or at least the majority a film's global run for analytical purposes. The time frame begins in December because it is typically the heaviest box office period, and so working with the calendar year data could bias the results for movies released during the holidays since their main run lies in the following year (Verhoeven et al. 2015). Only features that visited at least two countries from the dataset, had at least 20 screenings, and exhibited for at least seven days are selected to limit the sample to films that received a conventional international theatrical release. All movies that fit the selection criteria are included regardless of their box office revenue. The theatrical life of these films is tracked in 40 sample countries listed in Table A1 in Appendix. Eight countries available on the Kinomatics database have to be excluded due to low data quality. Unfortunately, quality information on large markets, Russia and China, is not available.

The main international distribution measures observed for the sample's movies are the number of global screenings, the geographical spread expressed in the number of countries visited, and the length of global theatrical run gauged in the number of days between a film's first and last screenings internationally. The term 'global' is used to refer to the 40 sample's countries. A number of movie, distribution, and production origin characteristics are also recorded and include the running time in minutes, eight genres,[6] three sizes of the distribution

[5] A feature film is defined by the Academy of Motion Pictures, Arts, and Sciences as any film that runs for 40 minutes or longer.
[6] Only the first named genre on the Kinomatics database is recorded.

company, four release seasons, whether features are co-produced, and the country of origin[7] (more information is provided later in Table 2).

Table 1 summarises information on the global supply in the current dataset by comparing the share of sample's films and screenings as well as the median number of showtimes, the geographical spread, and the length of run per genre, distributor, season, and origin. Selected movies receive a total of over 130 million showtimes with a typical feature getting around 1,200 screenings internationally, travelling to five countries, and staying in theatres for approximately 550 days. The distributions of the discussed continuous variables are highly skewed, which is common for data from movie industry where few films receive the majority of earnings, or, in this case, the most of the global exposure. Thus, in all observations, medians are used to report typical values as these are less affected by outliers compared to averages derived on a mean basis.

Most of the internationally released movies are dramas, while the most screened genre is action/adventure, and the few live event films contribute the fewest screenings. Typical action/adventure and animation movies exhibit the most and travel the widest, while animations also tend to run the longest, which results in both genres receiving almost four times larger shares of showtimes than their proportionate shares of films. While a typical live event movie exhibits the least, it travels widely. Interestingly, comedies tend to run the shortest and visit the fewest countries. Finally, typical documentaries get the fewest screenings, which translates to a 13 times smaller share of their global showtimes than their share of movies.

While most films are independently distributed, this category is largely underrepresented in terms of its proportionate share of screenings as fewer films disseminated by majors receive the majority of showtimes. Interestingly, typical movies released by any distributor are identical in their geographical spread as well as similar in their length of run and volume of screenings. This marginal variation across companies can be explained by the fact that 10% of the top-screening films released by majors, mini-majors, and independents receive 90%, 81%, and 75% of each group's showtimes, respectively. No substantial variation in the global measures is found across the seasons, except that winter-spring releases typically survive the longest.

[7] Only the top 20 origins based on the volume of films in the sample are recorded.

Table 1 Global supply and medians for the global screenings, the geographical spread, and the global length of run per genre, distributor, season, and origin

Attribute	Global supply				Global distribution measures		
	# Films	%	# Screenings	%	Mdn. screenings	Mdn. geo. spread	Mdn. run
All films	3,424	100%	130,455,277	100%	1,172.0	5.0	549.0
Action/adventure	292	8.5%	42,501,326	32.6%	6,982.0	7.0	505.5
Animation	134	3.9%	19,877,284	15.2%	6,858.0	7.0	611.5
Comedy	612	17.9%	24,733,811	19.0%	4,288.5	4.0	464.0
Documentary	737	21.5%	2,088,980	1.6%	188.0	5.0	568.0
Drama	1,313	38.3%	27,788,692	21.3%	1,045.0	5.0	571.0
Horror	123	3.6%	5,323,990	4.1%	1,050.0	5.0	472.0
Live event	31	0.9%	31,045	0.02%	442.0	7.0	537.0
Suspense/thriller	182	5.3%	8,110,149	6.2%	3,338.5	5.0	507.5
Major	970	28.3%	87,591,148	67.1%	1,407.5	5.0	558.0
Mini-major	370	10.8%	22,394,913	17.2%	1,778.5	5.0	552.0
Independent	2,084	60.9%	20,469,216	15.7%	1,020.5	5.0	543.5
Summer	640	18.7%	34,026,026	26.1%	1,262.0	5.0	520.0
Holiday	547	16.0%	21,429,807	16.4%	1,434.0	5.0	516.0
Winter-spring	1,309	38.2%	41,959,875	32.2%	989.0	5.0	618.0
Fall	928	27.1%	33,039,569	25.3%	1,270.5	5.0	518.5
Single origin	2,570	75.1%	92,274,949	70.7%	1,112.0	4.0	510.0
Co-production	854	24.9%	38,180,328	29.3%	1,336.5	9.0	623.5
USA	903	26.4%	108,066,663	82.8%	946.0	6.0	579.0
France	496	14.5%	10,277,978	7.9%	3,311.0	10.0	640.5
India	366	10.7%	4,555,478	3.5%	2,402.0	4.0	187.0
Germany	288	8.4%	5,029,294	3.9%	845.5	7.0	634.0
UK	260	7.6%	16,059,247	12.3%	1,135.5	9.0	613.5
Japan	193	5.6%	5,064,108	3.9%	3,362.0	3.0	475.0
Canada	167	4.9%	6,168,886	4.7%	368.0	5.0	565.0
Spain	132	3.9%	2,630,456	2.0%	1,565.0	7.0	596.5
Italy	131	3.8%	1,229,554	0.9%	1,595.0	6.0	606.0
Belgium	124	3.6%	1,936,007	1.5%	3,076.0	9.0	598.5
South Korea	97	2.8%	1,126,769	0.9%	4,310.0	5.0	516.0
Mexico	81	2.4%	1,064,156	0.8%	1,036.0	5.0	587.0
Switzerland	81	2.4%	1,111,898	0.9%	532.0	5.0	598.0
Argentina	80	2.3%	448,067	0.3%	434.0	5.0	582.0
Israel	74	2.2%	194,868	0.1%	409.0	5.5	556.0
Netherlands	72	2.1%	322,524	0.2%	1,088.5	5.0	555.5
Brazil	71	2.1%	706,152	0.5%	778.0	3.0	555.0
China	62	1.8%	2,706,184	2.1%	1,916.5	7.5	538.5
Sweden	59	1.7%	786,742	0.6%	3,233.0	8.0	606.0
Australia	51	1.5%	3,643,578	2.8%	1,081.0	6.0	611.0

Note. The shares for country data do not constitute 100% because co-produced films are attributed to all countries as individual movies and because only the top 20 origins are listed.

Co-productions outperform movies from a single origin across all measures. The only origins that receive larger shares of showtimes than their proportionate shares of films are the US, Australia, the UK, and China. The opposite is true for all other countries with Israel, the Netherlands, and Argentina being the most underrepresented in terms of screenings. Movies from South Korea, Japan, France, Sweden, and Belgium tend to exhibit the most, while films made in Canada, Israel, and Argentina the least. Features from France, the UK, and Belgium travel the widest, whereas movies produced in Japan, China, and India typically visit the fewest countries. Finally, Indian films tend to have record-short runs.

4 Method

In the first part of this paper, cluster analysis is used to identify an optimal number of distinct types of international film distribution based on three clustering variables, the global number of screenings, the geographical spread, and the global length of run. A partitioning clustering method, *k*-means procedure, is chosen instead of hierarchical methods because it is less affected by outliers, while the three clustering variables are known to be highly skewed, and because it is less computationally demanding and so can be applied to large datasets (Mooi & Sarstedt 2011). While the traditional *k*-means procedure requires pre-specifying the number of clusters, data analysis and visualisation software Tableau that is used for this exercise (see Tableau)[8] suggests an optimal number of groups corresponding to the first local maximum of the variance ratio criterion (VRC) proposed by Calinski and Harabasz (1974). VRC is also used to assess cluster quality and is defined as:

$$VRC = \frac{SS_B}{SS_W} \times \frac{(N-k)}{(k-1)} \tag{1}$$

where SS_B is the sum of the squares between clusters, SS_W the sum of the squares within clusters, k the number of clusters, and N the number of observations (Mooi & Sarstedt 2011).[9] The higher the VRC value, the more cohesive the segments as expressed in low within-cluster variance, and the more distinct the individual groups as expressed in high between-cluster variance. Tableau employs Lloyd's algorithm (1982) using squared Euclidean distances to perform the partitioning and automatically scales the values of all clustering

[8] "How clustering works in Tableau." Tableau. Retrieved from https://onlinehelp.tableau.com/current/pro/desktop/en-us/clustering_howitworks.html.
[9] As VCR is not defined for $k = 1$, it cannot detect single-cluster cases.

variables to prevent measures with larger ranges from dominating the results using min-max normalisation.

In the second part of this paper, the solution validity of the cluster analysis is tested by evaluating whether there are significant differences among the identified segments by applying multiple regression models of the same composition to each cluster. The specification explains the global number of screenings of a film *i* from a cluster *j* (in natural logarithm) as a function of three predictor groups: (1) the indicator of the global coverage, the geographical spread (in natural logarithm);[10] (2) movie attributes, the running time (in natural logarithm) and genre; (3) distribution characteristics, the size of the distributor and the release season; and (4) origin variables, whether a film is co-produced and its origin. The full set of variables is provided in Table 2, while the model is specified as:

$$\begin{aligned} \ln SCREENINGS\_GL_{ij} = \beta_0 + \beta_1 \ln GEO\_SPR\_GL_{ij} + \beta_2 \ln RUN\_TIME_{ij} + \\ \beta_{3\text{-}9} \text{ Genre Dummies}_{ij} + \beta_{10\text{-}11} \text{ Distributor Dummies}_{ij} + \\ \beta_{12\text{-}14} \text{ Season Dummies}_{ij} + \beta_{15}\, CO\text{-}PROD_{ij} + \\ \beta_{16\text{-}35} \text{ Origin Dummies}_{ij} + \varepsilon_{ij} \end{aligned} \tag{2}$$

where *i* and *j* stand for film and cluster, respectively; the terms β_r for r = 1-35 are parameters of the model, and ε_{ij} is an error term.[11] With these models, factors of importance in determining global exposure for each type of distribution are also identified. All models are applied with ordinary least squares (OLS) regression as the technique.

[10] Another distribution measure, the global length of the theatrical run, is excluded due to low correlation with ln *SCREENINGS_GL* in all clusters (see Table A2 in Appendix).

[11] ln *RUN_TIME* is removed from the models for Clusters 1 and 5 due to low correlation with ln *SCREENINGS_GL* (see Table A2 in Appendix), while dummies *LIVE_EVENT*, *SOUTH_KOREA*, *ARGENTINA*, *ISRAEL*, *NETHERLANDS*, and *BRAZIL* are omitted from the model for Cluster 5 because they are not reflected in the data.

Table 2 Description of variables included in the five cluster models

Variable	Description of variable
ln *SCREENINGS_GL*	Movie's total number of screenings in 40 countries, in natural logarithm.
ln *GEO_SPR_GL*	Movie's total number of countries visited, in natural logarithm.
ln *RUN_TIME*	Movie's duration in minutes, in natural logarithm.
Genre Dummies	7 dummies representing action/adventure (*ACTION_ADVNT*), animation (*ANIM*), comedy (*COMEDY*), documentary (*DOCO*), drama (*DRAMA*), horror (*HORROR*), and live concert, performance, or opera (*LIVE_EVENT*) genres, while omitting suspense/thriller.
Distributor Dummies	2 dummies representing six major distribution companies and their subsidiaries: Walt Disney Pictures, Warner Bros. Pictures, 20th Century Fox, Universal Pictures, Columbia Pictures, Paramount Pictures (*MAJOR*) and eight mini-major distribution companies and their subsidiaries: Lionsgate Films, STXfilms, Open Road Films, A24, The Weinstein Company, Amblin Partners, CBS Films, Metro-Goldwyn-Mayer Pictures (*MINI-MAJOR*),[12] while omitting independent distributors.
Season Dummies	3 dummies representing summer (Memorial Day to Labor Day) (*SUMMER*), holiday (Thanksgiving to mid-January) (*HOLIDAY)*, and winter/spring season (*WINT_SPR*), while omitting fall.
CO-PROD	A dummy that takes a value of 1 if the movie is produced by multiple countries and 0 otherwise.
Origin Dummies	20 dummies representing movies produced or co-produced[13] in the top 20 production origins based on the volume of films in the sample: *USA, FRANCE, INDIA, GERMANY, UK, JAPAN, CANADA, SPAIN, ITALY, BELGIUM, SOUTH_KOREA, MEXICO, SWITZERLAND, ARGENTINA, ISRAEL, NETHERLANDS, BRAZIL, CHINA, SWEDEN,* and *AUSTRALIA*, while omitting all other origins.

5 Results

5.1 Cluster analysis results

Results from the cluster analysis suggest splitting the data into five segments based on the three clustering variables, the global number of screenings, the geographical spread, and the global length of the theatrical run, thus demonstrating the existence of five distinct types of international cinema distribution as illustrated in Figure 1. The high value of the between-group sum of squares (352.9) shows a sufficient degree of separation between clusters, while the low value of the within-group sum of squares (67.1) demonstrates a satisfactory degree of cluster cohesion. The model well separates the data explaining 84% of the variance.

[12] No sample films are distributed by STXfilms or A24.
[13] Co-produced movies are attributed to all countries as individual films.

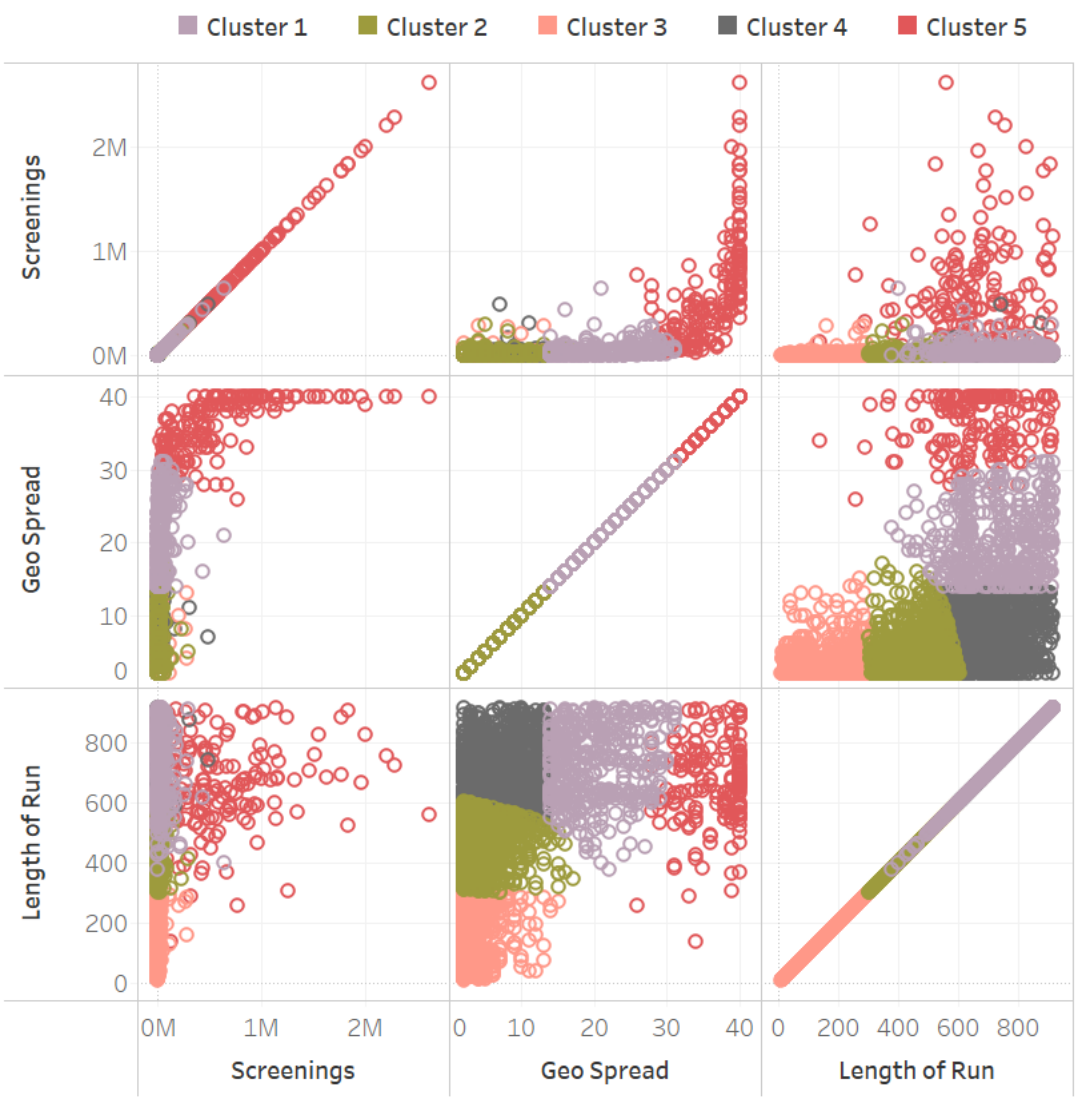

Fig. 1 Scatterplots portraying the sample's separation into five clusters across the global number of screenings, geographical spread, and the length of run.

The cluster analysis results are presented in Tables 3 and 4. Table 3 describes cluster centres, showing that while clusters 2 and 4 contain the most movies, films from clusters 5 and 1 on average screen the most and travel the widest. However, average features from clusters 1 and 4 stay in theatres the longest. Finally, movies from cluster 3 on average underperform across all three distribution measures. Table 4 shows results for ANOVA that is computed per three clustering variables, which prove that the proposed separation into segments is effective across all measures as expressed in highly significant values of the *F*-statistic. Further, the number of screenings is the most efficient clustering variable, while the length of run is the least effective as expressed in the magnitudes of the *F*-statistic.

Table 3 Mean values for cluster centres across three clustering variables per cluster

Cluster	*N*	Cluster centres		
		Screenings	Geo. spread	Run
1	422	31,527.0	20.06	726.59
2	1,154	5,331.7	4.52	462.66
3	704	5,106.0	3.31	151.83
4	976	5,994.0	6.97	706.67
5	168	604,480.0	36.30	664.95

Table 4 ANOVA results per clustering variable

Variable	Model		Error		*F*-statistic	*p*-value
	Sum of squares	df	Sum of squares	df		
Screenings	156.4	4	179.9	3,419	743.0	< 0.001
Geo. Spread	188.2	4	225.3	3,419	714.1	< 0.001
Length of Run	8.4	4	14.9	3,419	480.2	< 0.001

Table 5 displays the sizes of each cluster in terms of movies and screenings as well as the ranges in the three clustering variables. The size of the segment does not translate directly into the volume of global showtimes. On the contrary, cluster 5 that contains only 5% of the sample's movies amounts to the majority of screenings. In turn, clusters 2, 3, and 4 that together comprise the majority of sample's films only receive around 10% of the showtimes.

Table 5 Count and proportion of films and screenings as well as ranges of the three clustering variables per cluster

Cluster	Global supply				Global distribution measures					
					Screenings		Geo. spread		Run	
	Films	%	Screenings	%	Min.	Max.	Min.	Max.	Min.	Max.
1	422	12.3%	13,304,330	10.2%	59	638,829	14	31	379	916
2	1,154	33.7%	6,152,832	4.7%	20	291,307	2	17	301	606
3	704	20.6%	3,594,649	2.8%	20	274,996	2	15	10	311
4	976	28.5%	5,850,119	4.5%	21	489,005	2	13	545	916
5	168	4.9%	101,553,347	77.8%	25,775	2,609,014	26	40	136	916

Based on the visual segmentation into five clusters across the three clustering variables illustrated in the scatterplots in Figure 1, the positioning of the cluster centres displayed in Table 3, and the minimum and maximum values presented in Table 5, the segments can be grouped into three tiers of each clustering measure. Regarding the global screening volumes, clusters 2, 3, and 4 can be characterised as 'limited,' cluster 1 as 'wide,' and cluster 5 as 'blockbuster' releases. Similarly, concerning the geographical spread, clusters 2, 3, and 4 can be defined as having a 'narrow,' cluster 1 as having a 'broad,' and cluster 5 as having a 'global' reach. Finally, with regards to the duration in global theatres,

cluster 3 can be described as having 'short' and cluster 2 as having 'medium' runs, while clusters 1, 4, and 5 as having 'legs.' Thus, movies from cluster 1 are characterised as 'wide releases with a broad reach and legs,' from cluster 2 as 'limited releases with a narrow reach and medium runs,' from cluster 3 as 'limited releases with a narrow reach and short runs,' from cluster 4 as 'limited releases with a narrow reach and legs,' and from cluster 5 as 'blockbusters with a global reach and legs.'

Table 6 compares the sizes of movie, distribution, and origin characteristics across segments. The genre, distributor, and release season compositions are similar among clusters 1 to 4, with drama, documentary, and comedy dominating their movie profiles and most films released independently during the low seasons. In contrast, in cluster 5, action/adventure features amount to a third of movies, while the share of documentaries is marginal, and the majority of films are distributed by majors, while the share of releases from mini-majors is twice higher. Single origin productions dominate film profiles in all segments. However, while the division between the origin types is more even in clusters 1 and 5, co-productions are largely overshadowed in clusters 2 and 4 and constitute only a marginal share in cluster 3. The origin composition is similar in clusters 1 and 4 as the majority of their features are produced between the US and Europe with many originating from France, the UK, and Germany. In contrast, the only notable origins are the US and France in cluster 2, whereas India and the US in cluster 3. Finally, the overwhelming majority of movies from cluster 5 are made in the US with smaller shares produced in France and the UK, while none originating from South Korea, Argentina, Israel, the Netherlands, or Brazil.

5.2 Regression analysis results

Now that the cluster analysis has suggested a segmentation for the sample's films, multiple regression technique is employed to model the global distribution for the five segments producing quantifiable evidence about the observed group similarities and differences as well as the factors of importance in explaining global exposure of films from each distribution type. Table 7 presents the estimated coefficients marked by the significance of *p*-values across segments, while Table A3 in Appendix provides standard errors. The explanatory power of the models varies between 40% for cluster 4 and 77% for cluster 5, while the number of identified significant predictors ranges between ten in clusters 1 and 3 and 16 in cluster 2.

Table 6 Count and proportion of cluster films per movie, distributor, and origin categories

Variable	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Cluster 5	
	Films	%	Films	%	Films	%	Films	%	Films	%
All films	422	100%	1,154	100%	704	100%	976	100%	168	100%
Action/ adventure	25	5.9%	86	7.5%	73	10.4%	61	6.3%	47	28.0%
Animation	21	5.0%	36	3.1%	17	2.4%	43	4.4%	17	10.1%
Comedy	59	14.0%	187	16.2%	202	28.7%	135	13.8%	29	17.3%
Documentary	69	16.4%	298	25.8%	89	12.6%	277	28.4%	4	2.4%
Drama	203	48.1%	436	37.8%	238	33.8%	383	39.2%	53	31.6%
Horror	11	2.6%	41	3.6%	33	4.7%	30	3.1%	8	4.8%
Live event	11	2.6%	4	0.4%	7	1.0%	9	0.9%	-	-
Suspense/ thriller	23	5.5%	66	5.7%	45	6.4%	38	3.9%	10	6.0%
Major	104	24.6%	330	28.6%	168	23.9%	264	27.1%	104	61.9%
Mini-major	52	12.3%	125	10.8%	69	9.8%	89	9.1%	35	20.8%
Independent	266	63.0%	699	60.6%	467	66.3%	623	63.8%	29	17.3%
Summer	65	15.4%	213	18.5%	158	22.4%	164	16.8%	40	23.8%
Holiday	55	13.0%	179	15.5%	133	18.9%	154	15.8%	26	15.5%
Winter-spring	167	39.6%	340	29.5%	246	34.9%	500	51.2%	56	33.3%
Fall	135	32.0%	422	36.6%	167	23.7%	158	16.2%	46	27.4%
Single origin	221	52.4%	914	79.2%	643	91.3%	688	70.5%	104	61.9%
Co-production	201	47.6%	240	20.8%	61	8.7%	288	29.5%	64	38.1%
USA	140	33.2%	291	25.2%	114	16.2%	214	21.9%	144	85.7%
France	149	35.3%	117	10.1%	24	3.4%	178	18.2%	28	16.7%
India	17	4.0%	75	6.5%	226	32.1%	44	4.5%	4	2.4%
Germany	52	12.3%	83	7.2%	16	2.3%	125	12.8%	12	7.1%
UK	62	14.7%	57	4.9%	36	5.1%	75	7.7%	30	17.9%
Japan	12	2.8%	87	7.5%	48	6.8%	41	4.2%	5	3.0%
Canada	24	5.7%	59	5.1%	31	4.4%	44	4.5%	9	5.4%
Spain	22	5.2%	50	4.3%	10	1.4%	45	4.6%	5	3.0%
Italy	19	4.5%	45	3.9%	13	1.8%	51	5.2%	3	1.8%
Belgium	32	7.6%	39	3.4%	8	1.1%	36	3.7%	9	5.4%
South Korea	6	1.4%	48	4.2%	16	2.3%	27	2.8%	-	-
Mexico	10	2.4%	35	3.0%	5	0.7%	30	3.1%	1	0.6%
Switzerland	8	1.9%	30	2.6%	8	1.1%	31	3.2%	4	2.4%
Argentina	7	1.7%	35	3.0%	8	1.1%	30	3.1%	-	-
Israel	7	1.7%	36	3.1%	4	0.6%	27	2.8%	-	-
Netherlands	8	1.9%	28	2.4%	11	1.6%	25	2.6%	-	-
Brazil	8	1.9%	33	2.9%	9	1.3%	21	2.2%	-	-
China	7	1.7%	18	1.6%	13	1.8%	22	2.3%	2	1.2%
Sweden	13	3.1%	19	1.6%	3	0.4%	21	2.2%	3	1.8%
Australia	7	1.7%	12	1.0%	8	1.1%	19	1.9%	5	3.0%

Note. The shares per origin do not constitute 100% because co-produced films are attributed to all countries as individual movies and because only the top 20 origins are listed.

Table 7 Summarised regression results for the five cluster models, estimated coefficients

Independent variables	Dependent variable = *SCREENINGS_GL*				
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
C	0.922	–6.394***	–2.040	–4.525**	–1.339
GEO_SPR_GL	3.009***	0.915***	1.323***	0.898***	3.795***
RUN_TIME	X	2.596***	1.625***	2.239***	X
ACTION_ADVNT	0.252	0.300	0.008	1.085**	–0.041
ANIM	–0.394	0.685	0.585	1.182**	0.455*
COMEDY	–0.121	0.676**	0.193	0.774**	0.088
DOCO	–2.172***	–1.521***	–1.391***	–1.317***	–0.752*
DRAMA	–0.867**	–0.792***	–0.637*	–0.602*	–0.328
HORROR	–0.328	–0.847*	–0.118	–0.367	0.091
LIVE_EVENT	–3.148***	–3.282***	–1.853**	–2.449***	X
MAJOR	0.108	–0.058	–0.074	0.096	0.439**
MINI-MAJOR	0.619**	0.466**	0.028	0.279	0.229
SUMMER	–0.112	–0.132	–0.102	–0.036	0.022
HOLIDAY	0.424*	0.264	0.383*	–0.036	0.079
WINT_SPR	–0.235	0.016	–0.011	–0.201	0.101
CO-PROD	–0.525**	–0.471**	–0.431	–0.605***	0.235
USA	0.527**	0.128	–0.277	0.134	0.571**
FRANCE	0.356*	0.728***	0.493	0.598***	–0.418*
INDIA	1.058**	0.337	0.022	0.258	–0.057
GERMANY	–0.266	0.242	–0.435	0.226	–0.615**
UK	0.314	–0.264	–0.981**	0.063	–0.230
JAPAN	0.637	1.364***	1.222***	0.899**	–0.085
CANADA	–0.124	–0.139	–1.073**	0.012	–0.163
SPAIN	0.071	0.260	–0.234	0.507*	–0.334
ITALY	0.279	0.537*	0.090	0.378	–0.894*
BELGIUM	0.456	0.362	–0.426	0.008	–0.602*
SOUTH_KOREA	0.771	1.345***	0.151	0.616	X
MEXICO	0.496	1.048***	1.924**	0.123	–1.725**
SWITZERLAND	0.366	–0.110	–1.098	–0.003	–0.775*
ARGENTINA	0.077	0.048	–0.221	0.010	X
ISRAEL	0.140	–0.443	–1.315	–0.057	X
NETHERLANDS	–0.446	0.669*	–0.448	–0.038	X
BRAZIL	0.612	1.186***	0.679	0.119	X
CHINA	0.415	0.139	–0.054	–0.599	–0.076
SWEDEN	0.228	0.637	–0.002	0.616	0.744
AUSTRALIA	0.886	0.176	0.486	0.461	0.090
N	422	1,154	704	976	168
Adjusted R^2	0.545	0.411	0.425	0.404	0.766

*$p < .05$. **$p < .01$. ***$p < .001$.
Note. SCREENINGS_GL, *GEO_SPR_GL*, and *RUN_TIME* are expressed in the natural logarithm. Standard errors are presented in Table A3 in Appendix.

The only two variables that show significant impacts on global exposure in the same direction across all clusters are *GEO_SPR_GL* (positive) and *DOCO* (negative). This proves that the more countries films visit, the more showtimes they receive, and also that all documentaries have low exposure regardless of their distribution type (as expected). However, the effects from all other predictors differ in their significance and direction across

the models, which allows concluding that the split suggested by the cluster analysis is meaningful.

Nonetheless, *RUN_TIME* shows the expected significant positive impact on global exposure in clusters 2, 3, and 4, proving that the longer the film, the more showtimes it receives. It could be reasoned that no relationship is found in the 'wide release' and 'blockbuster' segments because movies have to be of high quality to secure wide distribution deals in the first place and so the variable loses its functionality as a proxy for quality as suggested by Moon et al. (2010).

Genres *LIVE_EVENT* and *DRAMA* demonstrate the expected significant negative effects on global exposure in all but the last clusters. Thus, all dramas receive few screenings unless they secure a 'blockbuster release with a global reach.' Interestingly, the genres with lower cultural specificity that should travel well internationally receive significantly higher exposure only in the 'blockbuster' and 'limited release with a narrow reach and legs' segments for *ANIM*, while only in the latter for *ACTION_ADVNT*. Further, *HORROR* demonstrates an unexpected negative impact for 'limited releases with a narrow reach and medium runs,' although its significance is low. In contrast, culturally specific *COMEDY* shows an unexpected significant positive influence for the 'limited releases with a narrow reach' that have both 'medium runs' and 'legs' segments.

Surprisingly, *MAJOR* has a significant positive impact on global exposure only in the 'blockbuster' cluster, while the significant positive effects of *MINI-MAJOR* are only observed in the 'wide release' and 'limited release with a narrow reach and medium runs' segments. These results support the findings by Litman and Kohl (1989) that having a film released by majors guarantees success, and that mini-majors "can often perform the same quality distribution (but on a smaller scale) as the majors" (p. 42). The only release season with a significant positive influence on global exposure and only in the 'wide release' and 'limited release with a narrow reach and short runs' clusters is *HOLIDAY*. This points to the lack of the global relevance of the North American seasons identified by Einav (2007), even though Yang and Kim (2014) find them to some extent applicable in South Korea.

Contrary to the belief that co-productions enjoy easier international distribution, *CO-PROD* demonstrates significant negative impact on global exposure for 'wide releases' as well as 'limited releases with a narrow reach' and both 'medium runs' and 'legs.' This is a surprising finding since co-productions outperform single origin productions on all measures as discussed in Section 2.

None of the specific origins, not even the US, demonstrates significant influences in all segments. However, American films from 'wide release' and 'blockbuster' clusters get significantly higher exposure, which shows that only American movies that are likely to be made in Hollywood perform better internationally. Interestingly, French 'wide releases' as well as 'limited releases with a narrow reach' and both 'medium runs' and 'legs' enjoy significantly higher global exposure, while 'blockbusters' from France screen significantly less. Similarly, Mexican 'limited releases with a narrow reach' and both 'short' and 'medium runs' get more screenings, while 'blockbusters' from Mexico exhibit less. In fact, 'blockbusters' from six countries other than the US have low exposure. In contrast, all three segments of Japanese 'limited releases' receive significantly more international showtimes. Finally, it is interesting to observe that British and Canadian 'limited releases with a narrow reach and short runs' receive fewer screenings, while English language movies are expected to travel well internationally (Marvasti 1994).

6 Conclusion

This paper uses a detailed dataset of film screenings in the global market comprising of 40 countries to discuss the trends of international contemporary cinema circulation. Focusing on the global number of showtimes, the geographical spread, and the length of the global theatrical run, five movie groups representing types of international film distribution are identified. The suggested split into segments is concluded to be meaningful as out of the 35 tested predictors of global exposure, only the geographical spread and documentary genre show significant uniform effects in all clusters. Also, a number of characteristics included in the previous studies on movie popularity and survival show unexpected influences on the global volume of screenings, especially in the three segments representing the 'limited release' movies. Finally, only the model representing the 'blockbuster' cluster explains over 75% of the variance in global exposure. These findings signal that more research addressing the behaviour of less popular titles, covering multiple screening countries, and including movies from various origins is needed to better understand the global contemporary cinema market.

References

Akdeniz, M. B., & Talay, M. B. (2013). Cultural variations in the use of marketing signals: A multilevel analysis of the motion picture industry. *Journal of the Academy of Marketing Science, 41*(5), 601-624. doi: 10.1007/s11747-013-0338-5

Alaveras, G., Gomez-Herrera, E., & Martens, B. (2018). Cross-border circulation of films and cultural diversity in the EU. *Journal of Cultural Economics*, 1-32. doi: 10.1007/s10824-018-9322-8

Arrowsmith, C., Verhoeven, D., Davidson, A., & Coate, B. (2014). Kinomatics: a global study into cinema data. In C. Arrowsmith, C. Bellman, W. Cartright & M. Shortis (eds), *Proceedings of the Geospatial Science Research 3 Symposium (GSR_3)* (1-8), Melbourne, 2-3 December. Retrieved from http://ceur-ws.org/Vol-1307/

Calinski, T., & Harabasz, J. (1974). A dendrite method for cluster analysis. *Communications in Statistics, 3*(1), 1-27. doi: 10.1080/03610927408827101

Chan-Olmsted, S. M., Cha, J. Y., & Oba, G. (2008). An examination of the host country factors affecting the export of U.S. video media goods. *Journal of Media Economics, 21*(3), 191-216. doi: 10.1080/08997760802300787

Chisholm, D. C., Fernández-Blanco, V., Ravid, S. A., & Walls, W. D. (2015). Economics of motion pictures: the state of the art. *Journal of Cultural Economics, 39*(1), 1-13. doi: 10.1007/s10824-014-9234-1

Chisholm, D. C., & Norman, G. (2006). When to exit a product: evidence from the US motion-picture exhibition market. *American Economic Review, 96*(2), 57-61. doi: 10.1257/000282806777212440

Chang, B. H., & Ki, E. J. (2005). Devising a practical model for predicting theatrical movie success: focusing on the experience good property. *Journal of Media Economics, 18*(4), 247-269. doi: 10.1207/s15327736me1804_2

Chung, J. E. (2011). Mapping international film trade: network analysis of international film trade between 1996 and 2004. *Journal of Communication, 61*(4), 618-640. doi: 10.1111/j.1460-2466.2011.01567.x

Ciciretti, R., Hasan, I., & Waisman, M. (2015). Distribution strategy and movie performance: an empirical note. *Eurasian Economic Review, 5*(1), 179-187. doi: 10.1007/s40822-015-0023-8

Coate, B., Verhoeven, D., Arrowsmith, C., & Zemaityte, V. (2017). Feature Film Diversity on Australian Cinema Screens: Implications for Cultural Diversity Studies Using Big

Data. In M. D. Ryan & B. Goldsmith (Eds.), *Australian Screen in the 2000s* (pp. 341-360). Cham: Springer International Publishing.

Coate, B., Verhoeven, D., Palmer, S., & Arrowsmith, C. (2016). Using big cultural data to understand diversity and reciprocity in the global flow of contemporary cinema. In *Proceedings of the International Symposium on the Measurement of Digital Cultural Products* (141-151), Montreal, 9-11 May. Retrieved from http://www.colloquemesurenumerique.stat.gouv.qc.ca/documents/UNESCO-DigitalCulturalSymp-interiorweb-r1.pdf

Craig, C. S., Greene, W. H., & Douglas, S. P. (2005). Culture matters: consumer acceptance of US films in foreign markets. *Journal of International Marketing, 13*(4), 80-103. doi: 10.1509/jimk.2005.13.4.80

Cucco, M. (2010). The borders of the domestic market and their importance for the economy of the film industry: the Swiss case study. *European Journal of Communication, 25*(2), 153-167. doi: 10.1177/0267323110363648

De Vany, A. S., & Walls, W. D. (1997). The market for motion pictures: rank, revenue, and survival. *Economic Inquiry, 35*(4), 783-797. doi: 10.1111/j.1465-7295.1997.tb01964.x

Deuchert, E., Adjamah, K., & Pauly, F. (2005). For Oscar glory or Oscar money? *Journal of Cultural Economics, 29*(3), 159-176. doi: 10.1007/s10824-005-3338-6

Elberse, A., & Eliashberg, J. (2003). Demand and supply dynamics for sequentially released products in international markets: The case of motion pictures. *Marketing Science, 22*(3), 329-354. doi: 10.1287/mksc.22.3.329.17740

Einav, L. (2007). Seasonality in the U.S. motion picture industry. *The RAND Journal of Economics, 38*(1), 127-145. doi: 10.1111/j.1756-2171.2007.tb00048.x

Einav, L., & Ravid, S. A. (2009). Stock market response to changes in movies' opening dates. *Journal of Cultural Economics, 33*(4), 311-319. doi: 10.1007/s10824-009-9105-3

Fu, W. W. (2006). Concentration and homogenization of international movie sources: examining foreign film import profiles. *Journal of Communication, 56*(4), 813-835. doi: 10.1111/j.1460-2466.2006.00321.x

Fu, W. W. (2009). Screen survival of movies at competitive theaters: vertical and horizontal integration in a spatially differentiated market. *Journal of Media Economics, 22*(2), 59-80. doi: 10.1080/08997760902900072

Fu, W. W. (2013). National audience tastes in Hollywood film genres. *Communication Research, 40*(6), 789-817. doi:10.1177/0093650212442085

Fu, W. W., & Govindaraju, A. (2010). Explaining global box-office tastes in Hollywood films: homogenization of national audiences' movie selections. *Communication Research, 37*(2), 215-238. doi: doi:10.1177/0093650209356396

Fu, W. W., & Lee, T. K. (2008). Economic and cultural influences on the theatrical consumption of foreign films in Singapore. *Journal of Media Economics, 21*(1), 1-27. doi: 10.1080/08997760701806769

Fu, W. W., & Sim, C. (2010). Examining international country-to-country flow of theatrical films. *Journal of Communication, 60*(1), 120-143. doi: 10.1111/j.1460-2466.2009.01455.x

Hanson, G. H., & Xiang, C. (2008). *Testing the Melitz model of trade: an application to US motion picture exports*. National Bureau of Economic Research Working Paper: 14461.

Hanson, G. H., & Xiang, C. (2009). International trade in motion picture services. In *International trade in services and intangibles in the era of globalization* (pp. 203-222). University of Chicago Press.

Hanson, G., & Xiang, C. (2011). Trade barriers and trade flows with product heterogeneity: an application to US motion picture exports. *Journal of International Economics, 83*(1), 14-26. doi: 10.1016/j.jinteco.2010.10.007

Holloway, I. R. (2013). Foreign entry, quality, and cultural distance: product-level evidence from US movie exports. *Review of World Economics, 150*(2), 371-392. doi: 10.1007/s10290-013-0180-3

Hoskins, C., & Mirus, R. (1988). Reasons for the US dominance of the international trade in television programmes. *Media, Culture & Society, 10*(4), 499-515. doi: 10.1177/016344388010004006

Izquierdo Sanchez, S. (2014). *Managing the supply of short-life products. A duration analysis approach using the UK film industry*. Munich Personal RePEc Archive: 79024.

Jayakar, K. P., & Waterman, D. (2000). The economics of American theatrical movie exports: an empirical analysis. *Journal of Media Economics, 13*(3), 153-169. doi: 10.1207/S15327736me1303_1

Kim, E. M. (2004). Market competition and cultural tensions between Hollywood and the Korean film industry. *International Journal on Media Management, 6*(3-4), 207-216. doi: 10.1080/14241277.2004.9669403

Kim, H., & Jensen, M. (2014). Audience heterogeneity and the effectiveness of market signals: How to overcome liabilities of foreignness in film exports? *Academy of Management Journal, 57*(5), 1360-1384. doi: 10.5465/amj.2011.0903

Lee, B., & Bae, H. S. (2004). The effect of screen quotas on the self-sufficiency ratio in recent domestic film markets. *Journal of Media Economics, 17*(3), 163-176. doi: 10.1207/s15327736me1703_3

Lee, F. L. F. (2006a). Audience taste divergence over time: an analysis of U.S. movies' box office in Hong Kong, 1989–2004. *Journalism & Mass Communication Quarterly, 83*(4), 883-900. doi: 10.1177/107769900608300410

Lee, F. L. F. (2006b). Cultural discount and cross-culture predictability: examining the box office performance of American movies in Hong Kong. *Journal of Media Economics, 19*(4), 259-278. doi: 10.1207/s15327736me1904_3

Lee, F. L. F. (2008). Hollywood movies in East Asia: examining cultural discount and performance predictability at the box office. *Asian Journal of Communication, 18*(2), 117-136. doi: 10.1080/01292980802021855

Lee, F. L. F. (2009). Cultural discount of cinematic achievement: the academy awards and U.S. movies' East Asian box office. *Journal of Cultural Economics, 33*(4), 239-263. doi: 10.1007/s10824-009-9101-7

Lee, S. W. (2002). An economic analysis of the movie industry in Japan. *The Journal of Media Economics, 15*(2), 125-139. doi: 10.1207/S15327736ME1502_4

Lee, S. W., & Waterman, D. (2007). Theatrical feature film trade in the United States, Europe, and Japan since the 1950s: An empirical study of the home market effect. *Journal of Media Economics, 20*(3), 167-188. doi: 10.1080/08997760701290591

Leenders, M. A., & Eliashberg, J. (2011). The antecedents and consequences of restrictive age-based ratings in the global motion picture industry. *International Journal of Research in Marketing, 28*(4), 367-377. doi: 10.1016/j.ijresmar.2011.06.001

Legoux, R., Larocque, D., Laporte, S., Belmati, S., & Boquet, T. (2015). The effect of critical reviews on exhibitors' decisions: do reviews affect the survival of a movie on screen? *International Journal of Research in Marketing*. doi: 10.1016/j.ijresmar.2015.07.003

Litman, B. R. (1983). Predicting success of theatrical movies: an empirical study. *The Journal of Popular Culture, 16*(4), 159-175. doi: 10.1111/j.0022-3840.1983.1604_159.x

Litman, B. R., & Kohl, L. S. (1989). Predicting financial success of motion pictures: the '80s experience. *Journal of Media Economics, 2*(2), 35-50. doi: 10.1080/08997768909358184

Lloyd, S. P. (1982). Least squares quantization in PCM. *IEEE Transactions on Information Theory*, 28(2), 129–137. doi:10.1109/TIT.1982.1056489.

Marvasti, A. (1994). International trade in cultural goods: a cross-sectional analysis. *Journal of Cultural Economics, 18*(2), 135-148. doi: 10.1007/BF01078936

Marvasti, A., & Canterbery, E. R. (2005). Cultural and other barriers to motion pictures trade. *Economic Inquiry, 43*(1), 39-54. doi: 10.1093/ei/cbi004

Marvasti, A. (2000). Motion pictures industry: economies of scale and trade. *International Journal of the Economics of Business, 7*(1), 99-114. doi: 10.1080/13571510084087

Masood, M. (2015). *New Evidence on Development and the Diversity of Cultural Imports*. Institut d'Economie et Econométrie, Université de Genève Working Paper: 15012.

McKenzie, J. (2009). Revealed word-of-mouth demand and adaptive supply: survival of motion pictures at the Australian box office. *Journal of Cultural Economics, 33*(4), 279-299. doi: 10.1007/s10824-009-9104-4

McKenzie, J., & Walls, W. D. (2012). Australian films at the Australian box office: performance, distribution, and subsidies. *Journal of Cultural Economics, 37*(2), 247-269. doi: 10.1007/s10824-012-9181-7

Meloni, G., Paolini, D., & Tena, J. d. D. (2018). American beauty: trade flows and export costs of US movies. *Journal of Cultural Economics*. doi: 10.1007/s10824-018-9324-6

Mooi, E., & Sarstedt, M. (2011). *A concise guide to market research: The process, data, and methods using IBM SPSS Statistics*. Berlin: Springer-Verlag. doi: 10.1007/978-3-642-12541-6_9

Moon, S., Bayus, B. L., Yi, Y., & Kim, J. (2014). Local consumers' reception of imported and domestic movies in the Korean movie market. *Journal of Cultural Economics, 39*(1), 99-121. doi: 10.1007/s10824-013-9214-x

Moon, S., Bergey, P. K., & Iacobucci, D. (2010). Dynamic effects among movie ratings, movie revenues, and viewer satisfaction. *Journal of Marketing, 74*(1), 108-121.

Moreau, F., & Peltier, S. (2004). Cultural diversity in the movie industry: a cross-national study. *Journal of Media Economics, 17*(2), 123-143. doi: 10.1207/s15327736me1702_4

Nelson, R. A., Donihue, M. R., Waldman, D. M., & Wheaton, C. (2001). What's an Oscar worth? *Economic Inquiry, 39*(1), 1-6. doi: 10.1093/ei/39.1.1

Oh, J. (2001). International trade in film and the self-sufficiency ratio. *The Journal of Media Economics, 14*(1), 31-44. doi: 10.1207/S15327736ME1401_03

Park, S. (2014). Changing patterns of foreign movie imports, tastes, and consumption in Australia. *Journal of Cultural Economics, 39*(1), 85-98. doi: 10.1007/s10824-014-9216-3

Prieto-Rodriguez, J., Gutierrez-Navratil, F., & Ateca-Amestoy, V. (2014). Theatre allocation as a distributor's strategic variable over movie runs. *Journal of Cultural Economics, 39*(1), 65-83. doi: 10.1007/s10824-014-9220-7

Sochay, S. (1994). Predicting the performance of motion pictures. *Journal of Media Economics, 7*(4), 1-20. doi: 10.1207/s15327736me0704_1

Song, R., & Shankar, V. (2012). *International Launch Window and Performance: Analysis of Movies*. Working Paper.

Verhoeven, D., Davidson, A., & Coate, B. (2015). Australian films at large: expanding the evidence about Australian cinema performance. *Studies in Australasian Cinema, 9*(1), 7-20. doi: 10.1080/17503175.2014.998098

Volz, Y., Lee, F. L., Xiao, G., & Liu, X. (2010). Critical events and reception of foreign culture: An examination of cultural discount of foreign-language films in the US before and after 9/11. *International Communication Gazette, 72*(2), 131-149. doi: 10.1177/1748048509353865

Walls, W. D. (1997). Increasing returns to information: evidence from the Hong Kong movie market. *Applied Economics Letters, 4*(5), 287-290. doi: 10.1080/758532594

Walls, W. D. (1998). Product survival at the cinema: evidence from Hong Kong. *Applied Economics Letters, 5*(4), 215-219. doi: 10.1080/135048598354843

Walls, W. D. (2009). The market for motion pictures in Thailand: rank, revenue, and survival at the box office. *International Journal of Business and Economics, 8*(2), 115-131.

Walls, W. D., & McKenzie, J. (2012). The changing role of Hollywood in the global movie market. *Journal of Media Economics, 25*(4), 198-219. doi: 10.1080/08997764.2012.729544

Waterman, D. (2005). *Hollywood's road to riches*. Cambridge, MA: Harvard University Press.

Waterman, D., & Jayakar, K. P. (2000). The competitive balance of the Italian and American film industries. *European Journal of Communication, 15*(4), 501-528. doi: doi:10.1177/0267323100015004003

Xu, X., & Fu, W. W. (2014). Aggregate bandwagon effects of popularity information on audiences' movie selections. *Journal of Media Economics, 27*(4), 215-233. doi: 10.1080/08997764.2014.963229

Yang, J., & Kim, W. (2014). Seasonality in the non-U.S. motion picture industry: a case of South Korea. *Journal of Media Economics, 27*(1), 38-55. doi: 10.1080/08997764.2013.873443

Zemaityte, V., Verhoeven, D., & Coate, B. (2018). Understanding the dynamics between the United States and Australian film markets: testing the '10% rule'. *Studies in Australasian Cinema*, 1-14. doi: 10.1080/17503175.2018.1427827

Appendix

Table A1 Forty screening countries included in the analysis

Countries						
Argentina	Chile	India	Luxembourg	The Philippines	Sweden	Ukraine
Australia	Colombia	Indonesia	Mexico	Portugal	Switzerland	The US
Belgium	Finland	Ireland	The Netherlands	Singapore	Taiwan	Venezuela
Brazil	France	Israel	New Zealand	South Africa	Thailand	Vietnam
Bulgaria	Germany	Italy	Norway	South Korea	The UAE	
Canada	Greece	Japan	Peru	Spain	The UK	

Table A2 Correlations between the transformed continuous variables across clusters

Variables	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
SCREENINGS_GL & *GEO_SPR_GL*	.475***	.271***	.380***	.300***	.627***
SCREENINGS_GL & *RUN_GL*	–.050	–.003	.029	.045	.011
SCREENINGS_GL & *RUN_TIME*	.012	.360***	.392***	.302***	.071
GEO_SPR_GL & *RUN_GL*	.124*	.110***	.102**	–.023	.157*
GEO_SPR_GL & *RUN_TIME*	.095	.129***	.228***	.060	.244**
RUN_GL & *RUN_TIME*	–.152**	–.050	–.206***	–.046	.104

*$p < .05$. **$p < .01$. ***$p < .001$.

Table A3 Supplementary regression results for the five cluster models, standard errors

Independent variables	Dependent variable = *SCREENINGS_GL*				
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
C	(0.822)	(1.352)	(1.677)	(1.456)	(1.668)
GEO_SPR_GL	(0.265)	(0.095)	(0.131)	(0.097)	(0.465)
RUN_TIME	X	(0.293)	(0.361)	(0.309)	X
ACTION_ADVNT	(0.364)	(0.278)	(0.301)	(0.331)	(0.193)
ANIM	(0.372)	(0.362)	(0.462)	(0.369)	(0.226)
COMEDY	(0.303)	(0.240)	(0.263)	(0.296)	(0.208)
DOCO	(0.293)	(0.232)	(0.304)	(0.283)	(0.325)
DRAMA	(0.267)	(0.223)	(0.258)	(0.274)	(0.191)
HORROR	(0.442)	(0.335)	(0.369)	(0.392)	(0.260)
LIVE_EVENT	(0.464)	(0.864)	(0.661)	(0.593)	X
MAJOR	(0.141)	(0.115)	(0.146)	(0.118)	(0.137)
MINI-MAJOR	(0.187)	(0.164)	(0.216)	(0.180)	(0.152)
SUMMER	(0.185)	(0.142)	(0.179)	(0.180)	(0.126)
HOLIDAY	(0.202)	(0.151)	(0.188)	(0.187)	(0.136)
WINT_SPR	(0.143)	(0.123)	(0.160)	(0.150)	(0.114)
CO-PROD	(0.172)	(0.158)	(0.269)	(0.150)	(0.153)
USA	(0.160)	(0.139)	(0.192)	(0.150)	(0.171)
FRANCE	(0.167)	(0.185)	(0.364)	(0.160)	(0.189)
INDIA	(0.327)	(0.231)	(0.193)	(0.268)	(0.295)
GERMANY	(0.202)	(0.208)	(0.419)	(0.173)	(0.183)
UK	(0.192)	(0.237)	(0.288)	(0.205)	(0.150)
JAPAN	(0.365)	(0.208)	(0.271)	(0.274)	(0.263)
CANADA	(0.272)	(0.238)	(0.313)	(0.253)	(0.208)
SPAIN	(0.289)	(0.257)	(0.533)	(0.255)	(0.284)
ITALY	(0.295)	(0.266)	(0.457)	(0.238)	(0.416)
BELGIUM	(0.245)	(0.295)	(0.624)	(0.290)	(0.274)
SOUTH_KOREA	(0.515)	(0.262)	(0.412)	(0.319)	X
MEXICO	(0.414)	(0.298)	(0.728)	(0.301)	(0.570)
SWITZERLAND	(0.438)	(0.319)	(0.578)	(0.300)	(0.307)
ARGENTINA	(0.489)	(0.302)	(0.573)	(0.312)	X
ISRAEL	(0.461)	(0.294)	(0.825)	(0.317)	X
NETHERLANDS	(0.467)	(0.331)	(0.501)	(0.328)	X
BRAZIL	(0.433)	(0.306)	(0.548)	(0.354)	X
CHINA	(0.481)	(0.421)	(0.475)	(0.360)	(0.424)
SWEDEN	(0.354)	(0.396)	(0.917)	(0.364)	(0.384)
AUSTRALIA	(0.461)	(0.491)	(0.578)	(0.374)	(0.270)
N	422	1,154	704	976	168
Adjusted R^2	0.545	0.411	0.425	0.404	0.766
F-statistic	13.638	22.327	14.084	18.169	16.271
Prob. of *F*-statistic	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

Note. SCREENINGS_GL, *GEO_SPR_GL*, and *RUN_TIME* are expressed in the natural logarithm.