

## THE EFFECT OF SOCIAL INFLUENCE ON MARKET INEQUALITIES IN THE MOTION PICTURE INDUSTRY

SEBASTIANO A. DELRE<sup>\*,†,‡</sup>, THIJS L. J. BROEKHUIZEN<sup>\*,§</sup>  
and WANDER JAGER<sup>\*,¶</sup>

*\*Faculty of Economics and Business,  
University of Groningen, PO Box 800,  
9700 AV Groningen, The Netherlands*

*†Faculty of Economics, LUISS Guido Carli,  
Viale Pola 12, 00198 Rome, Italy*

*‡sdelre@luiss.it*

*§t.l.j.broekhuizen@rug.nl*

*¶w.jager@rug.nl*

Received 14 April 2007  
Revised 28 January 2008

In this paper we investigate the degree to which two social influences, namely imitation and coordinated consumption, effectuate inequalities in the motion picture industry. We develop an agent-based model based on micro movie visitors' decision-making that generates the observed macro market outcomes. The simulation model makes use of the findings of an empirical survey amongst 1112 cinema visitors. We find that social influences explain market inequalities and that the impact of coordinated consumption on market inequalities is stronger than the impact of imitation.

*Keywords:* Motion picture market; market shares; agent-based systems; social influence; imitation; coordinated consumption.

### 1. Introduction

Consumers are guided by social and individual needs. Their decisions to purchase or consume a product are influenced by individual values such as self-fulfillment, sense of accomplishment, and self-respect, and by social values such as being well-respected, warm relationships with others, etc. [1]. This study investigates how individual and social needs shape the behavior of movie visitors in the cinema market and what the consequences are at the macro level of the market (i.e. distribution of revenues at the box office). Although in the last decade the motion picture market has been the object of an increasing number of studies, especially in the marketing field, the large majority of these works have focused on the supply of the industry (for a review see Ref. 2) and, in particular, on the effects of marketing efforts on the movies' box office [3–12]. Still, very little is known about how moviegoers decide to see a movie, what kind of evaluative criteria they use and, more importantly, how

strong the influence of friends, relatives and others is in deciding which movies to see [13].

Social influences play a dominant role in the motion picture industry [14, 15]. In this study we focus on two types of social influences, namely imitation (the influence of other consumers that have already seen the movie) and coordinated consumption (the influence of other consumers that have not seen the movie but are informed about it and may still want to see it), and we investigate their separate effects on the distribution of the box office revenues of the movies. Additionally, this study investigates whether the degree of these two types of social influences differs between two types of movies: art-house and mainstream movies. The rationale behind this is that moviegoers' motivations, attitudes and behaviors differ substantially for these two types of movies [16–18].

With the aim of obtaining useful insights for our agent-based model, we empirically investigate the decision-making of cinema visitors. Through the use of questionnaires we have collected data from more than 1000 respondents. Basically the data show that the moviegoers' decision-making and behaviors differ highly across movie types. We first construct a social orientation scale based on the distinction between social and individual motivations, and we then find evidence that this scale is higher for visitors to mainstream movies than for visitors to art-house movies, and that it is negatively correlated with the frequency of attendance. We use these insights for the experimental setting of our simulation model and test their effects on market outcomes. We find that market inequalities are explained by both kinds of social influences and that coordinated consumption impacts market inequalities more strongly than imitation does.

## **2. Social Influence: Imitation and Coordinated Consumption**

Social influence has long been recognized as an important force shaping consumer behaviors [18–23]. It may occur before consumption (for example, when seeking information and/or receiving word of mouth), during consumption (for example, when others are present in consumption contexts) and after consumption (for example, producing word of mouth) [22].

Consumers adjust their behaviors to match the expectations of other people or a reference group [24, 25]. Previous research distinguished between informational and normative social influence [26, 27]. Informational influence occurs through a process of internalization, where information from others is accepted as evidence about reality (Deutsch and Gerard [27]). Here, consumers can make more informed and accurate decisions with the help of others [25]. Normative influence is influence to comply with the expectations of others [28]; consumers can conform to the expectations of others in order to receive rewards or avoid punishments (i.e. utilitarian value), and/or to maintain or enhance their self-image (i.e. value-expressive value) [26, 29]. In sum, consumers can gain additional value by attaining three goals: (i) making more informed and accurate decisions, (ii) receiving rewards or avoiding punishments, and (iii) maintaining or enhancing self-image.

This study focuses on two types of social influence, namely imitation and coordinated consumption [30,31]. Imitation refers to the degree to which consumers are influenced by past behaviors and evaluations of others. It is likely to stimulate visiting behavior, as visitors become aware of the movie and its quality and may engage in imitative behaviors. Imitation is more likely to occur when a greater number of friends have already seen the movie [30]. It is informative in nature,<sup>a</sup> as consumers can make more informed and accurate decisions with the help of the recommendations of others. Coordinated consumption refers to the degree to which consumers are influenced by the intended behaviors of other consumers. It positively influences visiting behavior, as consumers are more likely to see a movie when a greater number of their friends still want to visit the movie, as they can more easily find friends to accompany them [30]. It is normative in nature, as the consumption of products together is frequently used as a means of strengthening the social bond, and of enhancing one's self-image [32]. The strong normative influences in the motion picture industry may partly explain why consumers frequently see movies together. Normative influences are particularly salient in this industry because the behaviors can be directly observed by friends and relatives [26–29, 33] and because movies are hedonic products that are inherently value-expressive.

Apart from the social influences, we also consider the motivations of visitors. Consumer motivations can help explain the relative strength of social influences on visiting behaviors. Motivation research argues that consumers have individual needs (e.g. learning about self, need for cognition, self-fulfillment and sense of accomplishment) and social needs (e.g. sense of belonging, warm relationships with others, and experience fun together) that drive their behaviors [34]. This distinction is very useful in explaining the individual's orientation or inclination toward social influence, i.e. people who have strong social needs are concerned with the fulfillment of their social needs and derive more value from it than those who have less strong social needs. Moreover, consumer motivations can also explain the preference for a certain type of movies. For example, an empirical motivational study distinguished between two types of movie visitors: Those who seek to satisfy their intellectual curiosity, are interested in human and social issues, value esthetics, and see "film as a form of art", and those who seek excitement and relaxation, and want to maintain social relationships [17]. The former visitors, who predominantly saw human and social drama movies, clearly resemble art-house movie visitors. The latter visitors, who chiefly saw entertainment movies, can be denoted as mainstream movie visitors.

Based on these insights, we expect that visitors to art-house movies have stronger individual motivations than visitors to mainstream movies, who are more outer-oriented and have stronger social motivations. We assume that social and individual motivations can explain the degree of social influence, which influences the preference for a movie type (mainstream vs. art-house movies).

<sup>a</sup>Imitation may also entail normative aspects (receiving rewards/avoiding punishment, and enhancing self-image) as consumers make norms salient by giving their opinions; however, we believe that the informational aspect of recommendations is dominant.

### 3. Social Versus Individual Motivation: Evidence from a Survey of Movie Visitors

We develop a questionnaire to investigate the degree to which imitation and coordinated consumption occur, and how these social influences correlate with the type of movie, individual and social motivations, and attendance frequencies.

Data have been collected by surveying 1112 cinema visitors that collectively visited 43 movies.<sup>b</sup> We surveyed visitors that either visited an art-house or watched a mainstream movie [35]. The rationale behind this is that moviegoers' motivations, attitudes and behaviors differ substantially for these two kinds of movies [15–18].

Mainstream movies and art-house movies differ significantly in a number of ways, but most dominantly in terms of their market share. According to the MPAA,<sup>c</sup> art-house movies account for only 3% of the total box office takings. Moreover, this types of movies can be distinguished in terms of their association with particular genres, narrative structures and contents [35, 36]; the degree of artistic versus commercial qualities [37, 38]; the budget size, the participation of movie stars and the occurrence of special effects [35, 37]; the number of opening screens [18, 39]; and the type of film distributor [8, 35].<sup>d</sup>

In the existing literature different definitions are used to characterize art-house versus mainstream movies. In accordance with prior studies [8, 35], we code the movies based on the type of cinema (art-house versus mainstream cinema) in which the movie is released. In our data set, examples of art-house movies are *Libertine*

<sup>b</sup>Data were collected from May until September 2006 in The Netherlands, China and Italy. In our analysis, we pooled the data together. Although cinema visitors' behaviors may vary across countries due to cultural differences, this analysis is beyond the scope of this research. We performed additional checks to investigate possible bias effects. The exploratory factor analysis for each country revealed that the same factor structure of individual and social motivations was found in all three countries, meaning that in each country they consider the same distinction between social and individual motivations. Although the mean scores differed across countries for individual motivations [ $F(2, 1098) = 21.5, p < 0.001$ ] and for social motivations [ $F(2, 1098) = 45.3, p < 0.001$ ], in all countries social motivations were stronger than individual motivations. Next, the strength of social motivations relative to individual motivations associated with each movie type and movie genre appeared very similar (for example, in each country social motivations were strongest for animation/family and weakest for biography/history). As such, we assume that the possible biases due to cultural differences are rather small, especially because we focus on the link between social and individual motivations with social influences and not on their strength.

<sup>c</sup>Theatrical market statistics of the Motion Picture American Association (MPAA). Accessible through <http://www.mpa.org/>

<sup>d</sup>In a previous empirical survey [15] we have collected longitudinal data about the kind of consumption of consumers that attended two movies during their complete life cycles. One, *Brothers*, was assumed to be a typical example of an art-house movie and another one, *The Interpreter*, was assumed to be a typical example of the mainstream movie. Although the data of this survey brought strong empirical evidence that the kind of consumption differed highly for the two movies, it was quite surprising to see that the analysis of these data did not find any significant correlation between the type of consumption and the time of consumption. This is the reason why in this following survey customers' heterogeneity due to timing effects is assumed to be limited and we could submit the questionnaires to movie visitors at any time of the movie's life cycle.

and *Transamerica*, and examples of mainstream movies are *The Da Vinci Code* and *Over the Hedge*.

Table 1 shows how the respondent's profiles (gender, age, education and attendance) and the use of information sources differ for these two types of movies. Subsequent  $\chi^2$  tests indicated that females are more likely to watch art-house movies, whereas males are more likely to watch mainstream movies [ $\chi^2(1) = 7.9, p < 0.001$ ]. Consistent with prior findings [17], our sample indicates that, particularly, younger people (<20 years) tend to watch mainstream movies while older people (36 and older) are more likely to watch art-house movies [ $\chi^2(4) = 70.3, p < 0.001$ ], and that art-house visitors are more highly educated than mainstream moviegoers

Table 1. Respondents' profiles for each movie type.

	Mainstream movie sample <i>N</i> = 557	Art-house movie sample <i>N</i> = 535	Difference test to check for dependency
Gender			
Male	259 (45.8%)	204 (37.4%)	$\chi^2(1) = 7.9, p < 0.001$
Female	307 (54.2%)	341 (62.6%)	
Age			
< 21	192 (34%)	72 (13%)	$\chi^2(4) = 70.3, p < 0.001$
21–25	123 (22%)	145 (27%)	
26–30	75 (13%)	92 (17%)	
31–35	66 (12%)	67 (12%)	
Education			
Primary school	22 (4%)	5 (1%)	$\chi^2(2) = 134.5, p < 0.001$
High school	184 (32%)	87 (16%)	
Secondary school	86 (15%)	31 (6%)	
College degree	99 (18%)	120 (22%)	
University degree	137 (31%)	301 (55%)	
Number of visits per year	11.6 (SD = 15.9)	12.1 (SD = 11.8)	<i>Z</i> value = 3.45, <i>p</i> = 0.002
In general, I want to know something about the movie quality before seeing the movie.	3.56 (SD = 1.05)	3.75 (SD = 1.14)	<i>t</i> value = 2.70, <i>p</i> = 0.007
Opinions of people who have already seen the movie are useful sources of information.	3.54 (SD = 1.05)	3.62 (SD = 1.10)	<i>t</i> value = 1.58, <i>p</i> = 0.209
TV ads, trailers, posters, etc. are useful sources of information about the movie quality.	3.51 (SD = 1.14)	3.34 (SD = 1.19)	<i>t</i> value = 2.44, <i>p</i> = 0.015
Reviews in magazines, and newspapers and on the Internet are useful sources of information.	3.49 (SD = 1.11)	3.80 (SD = 1.05)	<i>t</i> value = 4.69, <i>p</i> < 0.001

Note:  $\chi^2$  values refer to chi square tests; *Z* values refer to Mann–Whitney tests; and *t* values refer to independent sample *t* tests.

$[\chi^2(2) = 134.5, p < 0.001]$ . Moreover, art-house moviegoers go more regularly than mainstream moviegoers ( $Z$  value = 3.45,  $p = 0.002$ ). Finally, mainstream and art-house visitors also differ in their use of and reliance on information sources; compared to art-house visitors, mainstream visitors care less about the movie quality before seeing the movie ( $p = 0.007$ ), find marketing information sources (ads, trailers and posters) to be more useful ( $p = 0.015$ ), and critics' and visitors' reviews (magazines, newspapers and the Internet) less useful ( $p < 0.001$ ). Mainstream movies have greater signaling properties (famous actors and famous directors) and advertise heavily to attract consumers; therefore, mainstream visitors may have a less strong need to engage in search activities.

The survey contains items for measuring imitation and coordinated consumption. Imitation, referring to the degree to which consumers are influenced by other consumers' past behaviors and evaluations, is assessed by asking respondents to report the number of people that recommended them to see the movie. Coordinated consumption, referring to the acquaintances that still want to go to see the movie, is measured by using the number of companions for their current visit. In Table 2 we show the items used to measure imitation and coordinated consumption and how these differ between the movie types. It appears that art-house moviegoers receive fewer messages from their environment than mainstream movie visitors ( $Z = 3.44, p = 0.001$ ), and that coordinated consumption is stronger for mainstream movie visitors as they attend in larger groups ( $Z = 6.88, p < 0.001$ ).

In order to shed light on the drivers of the moviegoers' decision-making we investigate their individual and social motivations. This motivation classification can help explain which movie type (art-house versus mainstream) moviegoers attend, and to what degree social influences take place. We test the underlying factor structure by performing exploratory factor analysis. The two factors (individual and social motivations) found in the data set explain more than 60% of the variance in the data. Each item loads highly ( $> 0.60$ ) on its assigned factor (Table 3).

The results of the factor analysis allow us to construct scales for individual motivations and for social motivations based on item means. Table 4 displays the descriptives of these scales for each movie type. Although social motivations score higher than individual motivations in both settings, the results clearly demonstrate that art-house moviegoers have stronger individual motivations than mainstream moviegoers.

Table 2. Imitation and coordinated consumption for each movie type.

	Mainstream movies	Art-house movies	$Z$ value	Significance
Imitation: How many people had recommended you to see this movie?	1.89 (SD = 3.27)	1.27 (SD = 2.70)	3.44	0.001
Coordinated consumption: With how many people did you see the movie?	2.28 (SD = 1.57)	1.66 (SD = 1.27)	6.88	< 0.001

Table 3. Exploratory factor analysis for social motivations and individual motivations.

Item	Social motivations	Individual motivations
I go to see a movie at the cinema especially because I want to have an enjoyable evening with friends/partners/family members.	0.66	
I go to see a movie at the cinema just to spend some time.	0.78	
I go to see a movie at the cinema purely for entertainment.	0.80	
I go to see a movie at the cinema in order to develop my own idea about a specific issue.		0.78
I go to see a movie at the cinema in order to become an expert about movies.		0.81
Eigenvalues	1.70	1.36
Variance explained	33.9%	27.1%

*Note:* Exploratory factor analysis ( $N = 1101$ ) is performed with Oblimin rotation and based on the eigenvalues criterion. Items are measured using five-point Likert scales, anchoring at 1 = “totally disagree” to 5 = “totally agree.”

Table 4. Mean scores of social versus individual motivations for each movie type.

	Mainstream movies	Art-house movies	$t$ value	Significance
Social motivations	3.42	3.02	7.22	< 0.001
Individual motivations	2.35	2.51	-2.79	0.005
Social orientation: social motivations/(individual + social motivations)	0.55	0.60	6.62	< 0.001

*Note:* Constructs are transformed to five-point Likert scales. 1 = weak motivation; 5 = strong motivation.

At this point it is possible to obtain a single scale which indicates the *relative* strength of social motivations by considering the strength of social motivations relative to the sum of individual and social motivations: the social *orientation* scale. We investigate how this social orientation scale correlates with imitation, coordinated consumption and the number of visits (Table 5). Correlations are not particularly high, but they are mostly significant. Our social orientation scale is correlated ( $\rho = 0.09$ ) with coordinated consumption (i.e. the number of companions attending the movie). Moreover, as also expected from the results reported in Table 1, we find a negative correlation between the frequency of attendance and the social orientation scale ( $\rho = -0.15$ ).

#### 4. The Agent-based Model

Here we present the complete simulation model of the motion picture market, and its assumptions. The core of this agent-based model is the individual decision-making of moviegoers. All agents decide which movie to see at each time step. After agent  $i$

Table 5. Correlations between social orientation, imitation, coordinated consumption, and frequency of attendance.

	Social orientation	Imitation	Coordinated consumption
Imitation: number of people that had recommended the respondent to see the movie	-0.06		
Coordinated consumption: number of people that went with the respondent to see the movie	0.09**	0.11**	
Number of visits per year	-0.15**	-0.04	-0.11**

Note: \*Sign. at 0.05; \*\*Sign. at 0.01 based on one-tailed tests.

is informed about the movies according to Eq. (1) or (2), it evaluates the expected utilities of these movies according to Eq. (3) and visits the movie that has the highest expected utility.

$\text{BUZZ}_{jt}$  is the buzz of movie  $j$  at time  $t$  that is generated by the advertisement of the movie. In our agent-based model, it is used as the probability for agent  $i$  to be informed about movie  $j$  at time  $t$ . At time 0, just before the movie is released into the theaters,  $\text{BUZZ}_{j0}$  depends on the advertisement budget of movie  $j$ ,  $M_j$ , and on  $\omega_1$  which is a free parameter of the model and which indicates how strong the informative effect of the advertising budget is. After the movie is released,  $\text{BUZZ}_{jt}$  evolves as specified in Eq. (2).  $\text{Box}_{j,t-1}$  is the box office which movie  $j$  has obtained at the previous time step and  $\delta_1$  is a free parameter. This formalization assumes that  $\text{BUZZ}_{jt}$  evolves according to the success that movie  $j$  has at the box office. The more the success a movie gains after release, the higher its buzz becomes. Here  $\delta_1$  determines how fast the evolution toward the actual box office of the movie is after its release. If  $\delta_1$  is very low, then agents retain the effects of the advertisement budget longer and are less affected by the results that the movie has at the box office; if  $\delta_1$  is very high, then agents forget sooner the effects of the initial campaign and are more affected by the results that the movie has at the box office.

$$\text{BUZZ}_{j0} = e^{-\frac{\omega_1}{M_j}}, \quad (1)$$

$$\text{BUZZ}_{jt} = \text{BUZZ}_{j,t-1} + \delta_1 \cdot \left( \frac{\text{Box}_{j,t-1}}{N} - \text{BUZZ}_{j,t-1} \right). \quad (2)$$

The agent's utility consists of two components: individual utility and social utility [Eq. (3)]. Individual utility is based on the fit between the individual preferences and the movie characteristics [Eq. (4)]. This fit,  $[1 - (m_j - p_i)]$ , is measured by the distance between the preferences of agent  $i$ ,  $p_i$ , and the characteristics of movie  $j$ ,  $m_j$ . Social utility is derived from what other agents do [Eq. (5)]. Two concepts are formalized in social utility: imitation effect  $a_{jt}$ , given by the proportion of agents that have already seen movie  $j$  [Eq. (6)], and coordinated consumption effect  $w_{jt}$ , given by the proportion of agents that are informed about movie  $j$  but have not seen it yet [Eq. (7)]. The individual utility increases proportionally to the degree to



which the movie characteristics match the preferences of the agent,  $p_i$ . The social utility increases linearly when the effects of both coordinated consumption and imitation increase.

$$E[U_{ijt}] = \beta_i \cdot x_{jt} + (1 - \beta_i) \cdot y_{ij}, \tag{3}$$

$$y_{ij} = 1 - |m_j - p_i|, \tag{4}$$

$$x_{jt} = a_{jt} + w_{jt}, \tag{5}$$

$$a_{jt} = \frac{\text{TotBox}_{jt}}{N}, \tag{6}$$

$$w_{jt} = \text{BUZZ}_{jt} \cdot \left(1 - \frac{\text{TotBox}_{jt}}{N}\right). \tag{7}$$

As we assume that an agent cannot attend a movie more than once, coordinated consumption and imitation are proportions of the same market and, hence, the proportions cannot sum up to more than 1. As such, an increase in imitation corresponds to a decrease in coordinated consumption, and vice versa. This formalization has a strong shortcoming: because the proportion of agents that have seen the movie (imitation) and the proportion of agents that are informed about the movie but have not seen it yet (coordinated consumption) are competing proportions of the same population, the social utility function is convex, which is an unrealistic assumption. When, for example, a third of the agents have seen the movie and another third of the agents are informed about the movie but have not seen it yet, the social influence is weaker than when two thirds of the agents have seen the movie or than when two thirds of the agents are informed about the movie but have not seen it yet. To overcome this limitation, we propose a refined formalization where the social utility function is concave [Eq. (8)]. In this case, the social utility increases at a decreasing rate when the effects of both coordinated consumption and imitation increase. Here  $c_1$  weights the importance of imitation and determines a minimum level of social influence when  $w_{jt}$  is equal to 0, and  $c_2$  weights the importance of coordinated consumption and determines a minimum level of social influence when  $a_{jt}$  is equal to 0.

$$x_{jt} = \frac{c_1 \cdot a_{jt} + c_2 \cdot w_{jt}}{a_{jt} + w_{jt} + c_1 + c_2}. \tag{8}$$

The social component and the individual component are weighted by the parameter  $\beta_i$ . This parameter indicates the attitudes of the agents toward the consumption and measures how strong the social utility is compared to the individual utility. It corresponds to the social orientation scale that we have constructed and analyzed in the previous section. Consequently, in the following simulation experiments, settings with high  $\bar{\beta}$  formalize markets where moviegoers tend to see mainstream movies (strong social orientation) and settings with low  $\bar{\beta}$  formalize markets where moviegoers tend to see art-house movies (weak social orientation).

In order to study how movie revenues are distributed into the market, at the end of each simulation run for each of the  $M$  movies, we record the number of visitors

per movie and its market share, and then study the overall market inequality of market shares computing the GINI coefficient. This can vary from 0 (completely equal market shares for all movies) to 1 (a single movie takes it all) [40].

The simulation model described above is implemented in a realistic US cinema market context.<sup>e</sup> Each time step of the simulation corresponds to a week and at each time step new movies are introduced into the market. The model generates 480 movies per year, for 3 years. We select only the 480 movies that enter the market during the second year and we record their complete life cycle at the box office. In this way we avoid initial and final simulation distortions. As such, we consider only the competition of movies that are introduced in the first year and reach the second year, and the complete life cycles of movies introduced in the second year that reach the third year. To make the simulations more realistic, we take into account the famous season effect [41–43]: the number of agents making a decision at each time step given by a probability  $p_t$  is proportional to the attendance observed in the real market, and the number of movies released each week is also proportional to the attendance. Finally, we draw marketing budgets  $M_j$  from real data<sup>f</sup> and we set  $\omega_1 = 50,000,000$  and  $\delta_1 = 0.5$ . These parameters' values are based on theoretical foundations: the informative effect of advertising is stronger, more persistent and more prevalent than the persuasive effect [3, 7]. In our simulation runs, this setting of the parameters makes the majority of the agents aware of the movie before its release and lets the advertising effect remain effective for about 4–6 time steps after the release of each movie.

## 5. Results

### 5.1. *The effects of social orientation and social influences on market outcomes*

We begin by exploring the outcomes of the model simulating a simple artificial market of 50,000 agents where movies are assumed to have different characteristics ( $m_j = [0, 1]$ ) and agents to have different preferences ( $p_i = [0, 1]$ ). We vary  $\beta_i$  simulating different markets: from a low  $\bar{\beta}$  ( $\bar{\beta} = [0.0, 0.5]$ ), which implies a weak social orientation, to a very high  $\bar{\beta}$  ( $\bar{\beta} = [0.5, 1.0]$ ), which implies a strong social orientation.

The results reported below refer to the 200 movies with the highest market shares. Table 6 shows the variations of the GINI coefficient  $g$  for different levels of social orientation. These results clearly show that market inequalities arise because of social influences and increase according to the degree of social orientation included in the decision-making of the agents.

<sup>e</sup>We refer to the Motion Picture Association of America (MPAA), <http://www.mpa.org>.

<sup>f</sup>Data have been obtained from <http://www.variety.com>, <http://www.the-numbers.com> and <http://www.imdb.com>. Marketing expenditures vary linearly, from a minimum of US\$7,500 to a maximum of US\$37,000,000.

Table 6. GINI coefficient values for different levels of social orientation (from very weak to very strong social orientation).

Social orientation	$\bar{\beta} = 0.25$	$\bar{\beta} = 0.35$	$\bar{\beta} = 0.45$	$\bar{\beta} = 0.55$	$\bar{\beta} = 0.65$	$\bar{\beta} = 0.75$
GINI coefficient	0.531	0.553	0.577	0.599	0.619	0.634

However, as mentioned in Sec. 4, the formalization of social utility can be more sophisticated and realistic [Eq. (8)]. We investigate the implications of this formalization for imitation and coordinated consumption by setting the model with plausible values ( $\beta_i = [0.25, 0.75]$ ;  $m_j = [0, 1]$ ;  $\omega_1 = 50,000,000$  and  $\delta_1 = 0.5$ ) and conducting simulation runs for different values of  $c_1$  and  $c_2$ . Table 7 shows the variations of the GINI coefficient  $g$  for different values of  $c_1$  and  $c_2$ . The effects of both imitation and coordinated consumption increase market inequalities, but it is evident that coordinated consumption has a stronger impact on market inequalities than imitation.

### 5.2. Micro-calibration of the agent based model

The results of the previous section clearly show that social influence matters. In particular, both the definition and implementation of social orientation and the effects of coordinated consumption and imitation shape the final market outcomes. We have explored the outcomes of the model for an extensive area of the parameter space both for  $\bar{\beta}$  and for the weights of the imitation effect and the coordinated consumption effect,  $c_1$  and  $c_2$ . The problem which social simulation researchers are faced with is that it is difficult to find the parameters that closely represent reality. In our case, we seek to find the values of the parameters of our formalization that closely match the actual decision-making of the moviegoers. Next, we try to understand how these parameters and variables relate to each other. In social simulation, the operation of setting the parameters of the simulation model to the values that adhere most to reality is defined as calibration [44]. We decide to use the empirical results of the survey in order to conduct a microcalibration of our agent-based model and to study the effects on the market outcomes. However, instead of identifying and implementing the precise values of the variables and the relationships among them, we investigate how different strengths of those relationships affect the market outcomes.

Table 7. GINI coefficient values for different weights for imitation effect and coordinated consumption effect.

	$c_2 = 0.1$	$c_2 = 0.3$	$c_2 = 0.5$	$c_2 = 0.7$	$c_2 = 0.9$
$c_1 = 0.1$	0.505	0.522	0.530	0.535	0.538
$c_1 = 0.3$	0.514	0.526	0.533	0.537	0.540
$c_1 = 0.5$	0.518	0.528	0.534	0.538	0.540
$c_1 = 0.7$	0.520	0.529	0.535	0.539	0.541
$c_1 = 0.9$	0.521	0.529	0.535	0.439	0.541

Table 8. GINI coefficient values when  $r_{it}$  is proportional to  $\beta_i$ .

	$c_2 = 0.1$	$c_2 = 0.3$	$c_2 = 0.5$	$c_2 = 0.7$	$c_2 = 0.9$
$c_1 = 0.1$	0.502	0.518	0.526	0.531	0.534
$c_1 = 0.3$	0.510	0.522	0.528	0.532	0.535
$c_1 = 0.5$	0.514	0.524	0.530	0.533	0.536
$c_1 = 0.7$	0.516	0.524	0.530	0.534	0.536
$c_1 = 0.9$	0.517	0.525	0.530	0.534	0.536

Here we investigate the consequences of the relation between social orientation and attendance. In Sec. 3 we have shown that movie visitors that decide more according to their individual preferences tend to visit theaters more often than customers that are more socially oriented. We formalize this correlation deriving a new probability of attendance  $r_{it}$  [Eq. (9)] and we substitute this for the previous probability of attendance  $p_t$ . We set the model with the previous parameters' setting ( $\beta_i = [0.25, 0.75]$ ;  $m_j = [0, 1]$ ;  $\omega_1 = 50,000,000$  and  $\delta_1 = 0.5$ ) and compare the results of these simulation runs (Table 8) with the previous ones (Table 7). It is evident that market inequalities are hampered when the frequency of attendance is negatively correlated with social orientation. This effect reduces the values of  $g$  by about 1%, which appears to be relatively small compared to the effects of imitation and coordinated consumption.

$$r_{it} = \begin{cases} \bar{\beta} \geq \beta_i \Rightarrow p_t + (\bar{\beta} - \beta_i) \cdot (1 - p_t) \\ \text{otherwise} \Rightarrow p_t + (\bar{\beta} - \beta_i) \cdot p_t \end{cases} . \quad (9)$$

## 6. Conclusion

This paper tries to explain the strong market inequalities observed in the motion picture industry by social influence. The methodology used is characterized by a double facet. On the one hand, we develop an empirical study that investigates the social and individual motivations that shape the social influence and hence visitors' behavior. On the other hand, we design a simulation model that makes use of these empirical insights to investigate how social influences such as imitation and coordinated consumption determine market inequalities. The empirical survey finds support that the motion picture market is divided into two parts: a segment oriented toward entertainment consumption and a segment oriented toward art consumption. The former segment, in prevalence composed of males, younger and less educated visitors, is strongly socially influenced; it mainly attends mainstream movies, whose genres are usually comedy, thriller and action, and it does not visit the cinema too often. The latter segment, characterized by females, older and more educated visitors, is less socially influenced; it attends more art-house movies, whose genres are more often drama and biography, and it goes more often to the cinema. They feed our simulation model, furnishing useful insights.

The results of our simulation model show that market inequalities are strongly determined by the segment oriented toward entertainment consumption — which

scores high on social orientation — rather than by the segment oriented toward art consumption — which scores low on social orientation. When moviegoers perceive the cinema as entertainment, their decisions depend more strongly on what other moviegoers decide to do. In these cases, the decisions of moviegoers converge toward a few movies that obtain an additional advantage due to higher levels of coordinated consumption and imitation. Consequently, these movies more easily become hits and the difference between market shares increases. Further results of our simulation experiments show that the most important positive driver of market inequalities is coordinated consumption. This effect is more prevalent than the positive effect of imitation and it overcomes the negative effect that results from art consumption, which has a higher frequency of attendance than entertainment consumption. These results are somewhat contradictory to earlier studies [22, 28, 33], which found that informational influence (i.e. similar to imitation effect) more strongly affects behaviors than normative influence (i.e. similar to coordinated consumption effect). However, our results can be explained by the strong presence of social influence in the motion picture industry. Visitors frequently watch movies together in order to maintain social relationships and to maintain and improve their self-concept. These normative influences appear to have a strong effect on visitors' behavior. Especially when movies are watched together, norms become very salient and this stimulates conformity behaviors [25] that lead to convergent behaviors. As a result, the normative influence of coordinated consumption has a stronger effect on market inequalities than the informational influence of imitation. Our results also contribute to the understanding of the peculiar aspects of the motion picture industry. For example, the strong coordinated consumption effect can offer the reasons why big studio producers tend to prefer a platform strategy to a sleeper strategy [18]. Big studios prefer to heavily advertise movies before their release in order to convince large groups of moviegoers to watch the movie together at the opening weekend. This platform strategy is frequently used, and is likely to be much more effective than introducing the movie on a few cinema screens and then relying on the positive word of mouth that ignites the imitation effect.

## Acknowledgments

We thank Tammo Bijmolt for his useful comments on previous drafts of the paper. We are very much indebted to Fang Zeng, Maria Rotondi and Annalisa Delre for their assistance in collecting the data.

## References

- [1] Batra, R., Homer, P. M. and Kahle, L. R., Values, susceptibility to normative influence, and attribute importance weights: A nomological analysis, *J. Consum. Psychol.* **11** (2001) 115–128.
- [2] Eliashberg, J., Elberse, A. and Leenders, M. A. A. M., The motion picture industry: Critical issues in practice, current research and new research directions, *Market. Sci.* **25** (2006) 638–661.

- [3] Elberse, A. and Anand, B., Advertising and expectations: The effectiveness of prerelease advertising for motion pictures, Harvard Business School Working Paper (2006) Series No. 05–060.
- [4] Zufryden, F. S., Linking advertising to box office performance of new film releases, *J. Advert. Res.* (1996) Jul.–Aug., 29–41.
- [5] Prag, J. and Casavant, J., An empirical study on the determinants of revenues and marketing expenditures in the motion picture industry, *J. Cult. Econ.* **18** (1994) 217–235.
- [6] Basuroy, S., Chatterjee, S. and Ravid, A. S., How critical are critical reviews? The box office effects of film critics, star power and budgets, *J. Market.* **67** (2003) 103–117.
- [7] Eliashberg, J. and Shugan, S. M., Film critics: Influencers or predictors, *J. Market.* **61** (1997) 68–78.
- [8] Gemser, G., van Oostrum, M. and Leenders, M. A. A. M., The impact of film reviews on the box office performance of art house vs. mainstream motion pictures, *J. Cult. Econ.* **31** (2007) 343–363.
- [9] Albert, S., Movie stars and the distribution of financially successful films in the motion picture industry, *J. Cult. Econ.* **22** (1998) 249–270.
- [10] De Vany, A. S. and Walls, W. D., Uncertainty in the movie industry: Does star power reduce the terror of the box office? *J. Cult. Econ.* **23** (1999) 285–318.
- [11] Ravid, S. A., Information, blockbusters and stars: A study of the film industry, *J. Bus.* **72** (1999) 463–492.
- [12] Wallace, W. T., Seigerman, A. and Holbrook, M. B., The role of actors and actresses in the success of films: How much is a movie star worth? *J. Cult. Econ.* **17** (1993) 1–27.
- [13] Wierenga, B., Motion picture: Consumers, channels and intuition, *Mktg. Sci.* **25** (2006) 674–677.
- [14] Liu, Y., Word of mouth for movies: Its dynamics and impact on box office revenues, *J. Market.* **70** (2006) 74–89.
- [15] Delre, S. A., Jager, W., Bijmolt, T. H. A. and Janssen, M. A., Simulating the motion picture market: Why the hits take it all, *Proc. First World Conference in Social Simulation* (21–25 Aug. 2006, Kyoto, Japan).
- [16] Gemser, G. and De Haas, A., Determining value when nobody knows anything: How to select winners in the independent movie industry, Working Paper (2006), University of Groningen.
- [17] Möller, K. K. E. and Karppinen, P., Role of motives and attributes in consumer motion picture choice, *J. Econ. Psychol.* **4** (1983) 239–262.
- [18] Sawhney, M. S. and Eliashberg, J., A parsimonious model for forecasting box-office revenues of motion pictures, *Market. Sci.* **15** (1996) 113–131.
- [19] Jager, W., Modelling consumer behavior, PhD thesis (University of Groningen, 2000).
- [20] Bearden, W. O., Netemeyer, R. G. and Teel, J. E., Measurement of consumer susceptibility to interpersonal influence, *J. Consum. Res.* **15** (1989) 473–481.
- [21] Hoffmann, A. O. I., Jager, W. and von Eije, J. H., Social simulation of stock markets: Taking it to the next level, *J. Artif. Soc. and Soc. Simulat.* **10** (2007) 7.
- [22] Mangleburg, T. F., Doney, P. M. and Bristol, T., Shopping with friends and teens' susceptibility to peer influence, *J. Retail.* **80** (2004) 101–116.
- [23] Terry, D. J. and Hogg, M. A., Group norms and the attitude–behavior relationship: A role for group identification, *Pers. Soc. Psychol. Bull.* **22** (1996) 776–793.
- [24] Sherif, M., *The Psychology of Social Norms* (Harper and Row, New York, 1936).
- [25] Cialdini, R. B. and Goldstein, N. J., Social influence: Compliance and conformity, *Ann. Rev. Psychol.* **55** (2004) 591–621.

- [26] Bearden, W. O. and Etzel, M. J., Reference group influence on product and brand purchase decisions, *J. Consum. Res.* **15** (1982) 183–194.
- [27] Deutsch, M. and Gerard, H. B., A Study of normative and informational influence upon individual judgment, *J. Abnorm. Soc. Psychol.* **51** (1955) 629–636.
- [28] Burnkrant, R. E. and Cousineau, A., Informational and normative social influence in buyer behavior, *J. Consum. Res.* **2** (1975) 206–215.
- [29] Childers, T. L. and Rao, A. R., The influence of familial and peer-based reference groups on consumer decisions, *J. Consum. Res.* **19** (1992) 198–211.
- [30] Hidalgo, C. A. R., Castro, A. and Rodriguez-Sickert, C., The effect of social interactions in the primary consumption life cycle of motion pictures, *New J. Phys.* **8** (2006) 52.
- [31] Tootelian, D. H. and Gaedeke, R. M., The teen market: An exploratory analysis of income, spending and shopping patterns, *J. Consum. Market.* **9** (1992) 35–44.
- [32] Chao, A. and Schor, J. B., Empirical tests of status consumption: Evidence from women’s cosmetics, *J. Econ. Psychol.* **19** (1998) 107–131.
- [33] Park, C. W. and Lessig, P. V., Students and housewives: Differences in susceptibility to reference group influence, *J. Consum. Res.* **4** (1977) 102–110.
- [34] Deci, E. L. and Ryan, R. M., *Intrinsic Motivation and Self-Determination in Human Behavior* (Plenum, New York, 1985).
- [35] Zuckerman, E. W. and Kim, T. Y., The critical trade-off: Identity assignment and box office success in the feature film industry, *Ind. Corp. Change* **12** (2003) 27–67.
- [36] Bordwell, D. and Thompson, K., *Film Art: An Introduction* (McGraw-Hill, New York, 2001).
- [37] Bagella, M. and Becchetti, L., The determinants of motion pictures box office performance: Evidence from movies produced in Italy, *J. Cult. Econ.* **23** (1999) 237–256.
- [38] Baumann, S., Marketing, cultural hierarchy, and the relevance of critics: Film in the United States, 1935–1980, *Poetics* **30** (2002) 243–262.
- [39] Reinstein, D. A. and Snyder, C. M., The influence of expert reviews on consumer demand for experience goods: A case study of movie critics, *J. Ind. Econ.* **53** (2005) 27–51.
- [40] Gilbert, N. and Troitzsch, K. G., *Simulation for the Social Scientist* (Open University Press, Philadelphia, 1999).
- [41] Elberse, A. and Eliashberg, J., Demand and supply dynamics for sequentially released products in international markets: The case of motion pictures, *Market. Sci.* **22** (2003) 329–354.
- [42] Ainslie, A., Dréze, X. and Zufryden, F., Modeling movie life cycles and market share, *Market. Sci.* **24** (2005) 508–517.
- [43] Vogel, H. L., *Entertainment Industry Economics: A Guide for Financial Analysis*, 4th edn. (Cambridge University Press, 1998).
- [44] Janssen, M. A. and Ostrom, E., Empirically based, agent-based models, *Ecol. Soc.* **11** (2006) 37.