The Effect of Social Influence on Market Inequalities in the Motion Picture Industry

Sebastiano A. Delre[1], Thijs L.J. Broekhuizen[2], Wander Jager[1]

[1] Department of Marketing
[2] Department of Strategy and Innovation
Faculty of Economics and Business
University of Groningen
P.O. Box 800, 9700 AV Groningen, the Netherlands
Email addresses: s.a.delre@rug.nl; t.l.j.broekhuizen@rug.nl; w.jager@rug.nl

Abstract. In this paper we investigate the degree to which two social influences, 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.

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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 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 [2]) and, in particular on the effects of marketing efforts on the movies' box office [3-12]. Still, very little is known about how movie goers 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 visit [13].

Social influences play a dominant role in the motion pictures industry [14-15]. In this study we focus on two types of social influences, namely imitation effect (the influence of other consumers that have already seen the movie) and coordinated consumption effect (the influence of other consumers that have not seen the movie but they are informed about it and they may still want to visit 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 movie goers' motivations, attitudes and behaviors substantially differ 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 one thousand respondents. Basically the data show that the movie goers' decision making and behaviors highly differ 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 of mainstream movies than for visitors of art house movies, that it is negatively correlated with the frequency of attendance and that it is relatively high for genres such as animation and comedy and low for drama and history. 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]. Social influence may occur before consumption (e.g., when seeking information and/or receiving word-of-mouth), during consumption (e.g., when others are present in consumption contexts), and after consumption (e.g., 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, 1955). Here, consumers can make more informed and accurate decisions with the help of others [25]. Normative influence is an 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: (1) making more informed and accurate decisions, (2) receiving rewards or avoiding punishments, and (3) 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 part of friends have already visited the movie [30]. It is informative in nature[1], 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 visit a movie when a greater part of their friends still wants 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 to strengthen the social bond, and to enhance one's self-image [32]. The strong normative influences in the motion picture industry may partly explain why consumers frequently visit 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 explaining 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 towards 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 intellectual curiosity, are interested in human and social issues, value esthetics, and see "film as a form of art", and those who seek excitement, relaxation and want to maintain social relationships [17]. The former visitors, who predominantly visited human and social drama movies, clearly resemble art house movie visitors. The latter visitors, who chiefly visited entertainment movies, can be denoted as mainstream movie visitors.

Based on these insights, we expect that visitors of art house movies have stronger individual motivations than visitors of 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).

[1] 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 on Movie Visitors

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

Data have been collected by surveying 1112 cinema visitors that collectively visited 43 movies[2]. We have surveyed visitors that either visited an art house or a mainstream movie [35]. The rationale behind this is that movie goers' motivations, attitudes and behaviors substantially differ 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[3], art house movies only account for 3 percent of the total box offices. Moreover these 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][4].

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

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[2] Data have been collected from May until September 2006 in the Netherlands, in China and in Italy. In our analyses, 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 ($F(2, 1098) = 21.5$, $p<.001$) and for social motivations ($F(2, 1098) = 45.3$, $p<.001$), 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 (e.g., in each country social motivations were strongest 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 the strength of them.

[3] Theatrical market statistics of the Motion Picture American Association (MPAA). Accessible through http://www.mpaa.org/

[4] 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 art house movie and another one, *The Interpreter*, assumed to be a typical example of mainstream movie. Although the data of this survey brought strong empirical evidence that the kind of consumption highly differed for the two movies, it was quite surprising to see that the analysis of this data did not find any significant correlation between the type of consumption and the time of the 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 life cycle.

Table 1 shows how the respondent profiles (gender, age, education and attendance) and the use of information sources differ for these two types of movies. Subsequent χ^2 tests indicate that females are more likely to go to art house movies, whereas males are more likely to visit mainstream movies ($\chi^2(1)= 7.9$, $p<.001$). Consistent with prior findings [17], our sample indicates that particularly younger people (< 20 years) tend to visit mainstream movies while older people (36 and older) are more likely to visit art house movies ($\chi^2(4)= 70.3$, $p<.001$), and that art house visitors are more highly educated than mainstream movie goers ($\chi^2(2)= 134.5$, $p<.001$). Moreover, art house movie goers also go more regularly than mainstream movie goers (Z-value=3.45, p=.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=.007), find marketing information sources (ads, trailers and posters) to be more useful (p=.015), and critics' and visitor reviews (magazines, newspapers, and internet) less useful (p<.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.

Table 1. Respondent's profile per movie type

	Mainstream movie sample N=557	Art house movie sample N=535	Difference test to check for dependency
Gender			
Male	259 (45.8%)	204 (37.4%)	$\chi^2(1)= 7.9$, $p<.001$
Female	307 (54.2%)	341 (62.6%)	
Age			
<21	192 (34%)	72 (13%)	$\chi^2(4)= 70.3$, $p<.001$
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%)	$\chi^2(2)= 134.5$, $p<.001$
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)	Z-value=3.45, p=.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)	t-value=2.70, p=.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)	t-value=1.58, p<.209

TV ads, trailers, posters, etc. are useful sources of information about movie quality	3.51 (SD=1.14)	3.34 (SD=1.19)	t-value=2.44, p=.015
Reviews on magazines, newspapers, and internet are useful sources of information.	3.49 (SD=1.11)	3.80 (SD=1.05)	t-value=4.69, p<.001

Note: χ^2 values are referring to chi square tests; Z-values are referring to Mann-Whitney tests; t-values are referring to Independent sample t-tests.

The survey contains items to measure 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 of their current visit. In Table 2 we show the items used to measure imitation and coordinated consumption and how these differ across movie type. It appears that art house movie goers receive fewer messages from their environment than mainstream movie visitors (Z=3.44, p=001), and that coordinated consumption is stronger for mainstream movie visitors as they attend in larger groups (Z=6.88, p<.001).

Table 2. Imitation and coordinated consumption per movie type

	Mainstream movies	Art house movie	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	.001
Coordinated consumption: With how many people did you see the movie?	2.28 (SD=1.57)	1.66 (SD=1.27)	6.88	<.001

In order to shed light on the drivers of the movie goers' decision making we investigate their individual and social motivations. This motivation classification can help explaining which movie type (art house versus mainstream) movie goers visit, and to what degree social influences take place. We test the underlying factor

structure by performing exploratory factor analysis. The two factors (individuals and social motivations) found in the dataset explain more than 60% of the variance in the data. Each item loads highly (>.60) on its assigned factor (Table 3).

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.	.66	
I go to see a movie at the cinema just to spend some time.	.78	
I go to see a movie at the cinema for pure entertainment.	.80	
I go to see a movie at the cinema in order to develop my own idea about a specific issue.		.78
I go to see a movie at the cinema in order to become an expert about movies.		.81
Eigenvalues	1.70	1.36
Variance explained	33.9%	27.1%

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

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

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 motivation: 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 (ρ=.09) with coordinated consumption (i.e., 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 (ρ=-.15).

Finally, we also check whether the social orientation scale differs across genres[5]. Table 6 ranks the social orientation scale according to the genres of the movies. The analysis reveals significant differences between genres. In particular

[5] The genre of each movie is based on IMDb's classification. Sometimes, multiple genres are assigned to the same movie (e.g., DaVinci Code was coded as *drama*, *mystery* and *thriller*).

animation/family, comedy and adventure/thriller/action/fantasy score high and romance, drama and history/biography score low on social orientation.

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

	Mainstream movies	Art house movie	t-value	Significance
Social motivations	3.42	3.02	7.22	<.001
Individual motivations	2.35	2.51	-2.79	.005
Social orientation: Social motivations/ (individual + social motivations)	0.55	0.60	6.62	<.001

Note: Constructs are transformed to 5 point Likert scales. 1=weak motivation, 5=strong motivation.

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

	Social orientation: social motivations/ (individual + social motivations)	Imitation: number of people that had recommended the respondent to go to the movie	Coordinated consumption: number of people that went with the respondent to the movie
Imitation: number of people that had recommended the respondent to go to the movie	-.06		
Coordinated consumption: number of people that went with the respondent to go the movie	.09**	.11**	
Number of visits per year	-.15**	-.04	-.11**

*Note: * sign. at .05; ** sign. at .01 based on one-tailed tests*

Table 6. Mean scores social motivations and individual motivations per movie genre

	Social motivations	Individual motivations	Social orientation: Social /(Individual + Social motivations)
animation/family	3.37	2.25	0.60
comedy	3.38	2.39	0.59
adventure/thriller/action/fantasy	3.33	2.42	0.58
romance	3.15	2.33	0.57
drama	3.15	2.43	0.57
biography/history	2.61	2.52	0.52

Note: Constructs are transformed to 5 point Likert scales. 1=weak motivation, 5=strong motivation. Social orientation ranges from 0 (very weak social orientation to 1 (very strong social orientation).

4 The agent based model

Here below 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 movie goers. All agents decide which movie to see at each time step. After agent *i* is informed about the movies according to (1) or (2), it evaluates the expected utilities of these movies according to (3) and it visits the movie that has the highest expected utility.

$BUZZ_{jt}$ is the buzz of movie *j* at time *t* that is generated by the advertising of the movie. In our agent based model it formalizes the probability that agent *i* is informed about movie *j* at time *t*. At time 0, just before the movie is released into the cinema theaters, $BUZZ_{j0}$ depends on the advertisement budget of movie *j* M_j, and on ω_1 which is a free parameter of the model and it indicates how strong the informative effect of the advertising budget is. After the movie is released, $BUZZ_{jt}$ evolves as specified in (2). $Box_{j,t-1}$ is the box office movie *j* has obtained at the previous time step and δ_1 is a free parameter. This formalization assumes that $BUZZ_{jt}$ evolves according to the success that the movie *j* has at the box office. The more the success a movie gains after release, the higher its buzz becomes. Here δ_1 determines how fast the evolution toward the actual box office of the movie is after its release. If δ_1 is very low then agents retain the effects of advertisement budget longer and they are less affected by the results that the movie has at the box office; if δ_1 is very high then agents forget sooner the effects of the initial campaign and they are more affected by the results that the movie has at the box office.

$$BUZZ_{j0} = e^{-\frac{\omega_1}{M_j}} \tag{1}$$

$$BUZZ_{jt} = BUZZ_{j,t-1} + \delta_1 \cdot \left(Box_{j,t-1}/N - BUZZ_{j,t-1}\right) \tag{2}$$

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

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

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

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

$$a_{jt} = \frac{TotBox_{jt}}{N} \tag{6}$$

$$w_{jt} = BUZZ_{jt} \cdot \left(1 - \frac{TotBox_{jt}}{N} \right) \tag{7}$$

As we assume that an agent cannot visit the same movie more than once, coordinated consumption and imitation are proportions of same market and, hence, the proportions cannot sum up to more than 1. As such, an increase in imitation corresponds with 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 that 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 has seen the movie and another third of the agents is informed about the movie but has 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 (8). In this case, social utility increases at a decreasing rate when both the effects of coordinated consumption and imitation increase. Here c_1 weights the importance of imitation and it determines a minimum level of social influence when w_{jt} is equal to 0 and c_2 weights the importance of coordinated consumption and it 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 β_i. This parameter indicates the attitudes of the agents towards the consumption and it measures how strong the social utility is compared to the

individual utility. β_i corresponds with the social orientation scale that we have constructed and analyzed in the previous section. Consequently, in the following simulation experiments, settings with high $\overline{\beta}$ formalize markets where movie goers tend to see mainstream movies (strong social orientation) and settings with low $\overline{\beta}$ formalize markets where movie goers 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 v_j, compute its market share s_j (9) and we then study the overall market inequality of market shares computing the GINI coefficient g [40]. This can vary from 0 (completely equal market shares for all movies) to 1 (a single movie takes it all) (10).

$$s_j = \frac{v_j}{\sum_{j=1}^{M} v_j} \tag{9}$$

$$g = \frac{\sum_{i=1}^{M} \sum_{j=1}^{M} \left| s_i - s_j \right|}{2 \cdot M \cdot \sum_{k=1}^{M} s_k} \tag{10}$$

The simulation model described above is implemented in a realistic USA cinema market context[6]. 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 only consider 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[7] and we set ω_1 =50,000,000 and δ_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

[6] We refer to the Motion Picture Association of America (MPAA), http://www.mpaa.org.

[7] Data have been obtained from http://www.variety.com/, http://www.the-numbers.com, http://www.imdb.com. Marketing expenditures vary linearly from a minimum of $ 7,500 to a maximum of $ 37,000,000.

and lets the advertising effect remain effective for about 4-6 time steps after the release of each movie.

5 Results

In section 5.1 we explore how marketing inequalities change at different levels and for different formalizations of social orientation. In section 5.2 we implement the guidelines of the empirical investigation presented in section 3 and we study their consequences.

5.1 The effects of social orientation and social influences on market outcomes

We begin 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 have different preferences (p_i =[0, 1]). We vary β_i simulating different markets: from a low $\overline{\beta}$ ($\overline{\beta}$ =[0.0, 0.5]) which implies a weak social orientation to a very high $\overline{\beta}$ ($\overline{\beta}$ =[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 7 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.

However, as mentioned in section 4, the formalization of social utility can be more sophisticated and realistic (8). We investigate the implications of this formalization for imitation and coordinated consumption by setting the model with plausible values (β_i =[0.25, 0.75]; m_j =[0, 1]; ω_1 =50000000 and δ_1 =0.5) and conducting simulation runs for different values of c_1 and c_2. Table 8 shows the variations of the GINI coefficient g for different values of c_1 and c_2. Both the effects of imitation and coordinated consumption increase market inequalities, but it is evident that coordinated consumption has a stronger impact on market inequalities than imitation.

Table 7. GINI coefficient values for different levels of social orientation (from very weak to very strong social orientation)

Social orientation	GINI coefficient
$\overline{\beta}$ =0.25	0.531
$\overline{\beta}$ =0.35	0.553
$\overline{\beta}$ =0.45	0.577

$\overline{\beta}$ =0.55	0.599
$\overline{\beta}$ =0.65	0.619
$\overline{\beta}$ =0.75	0.634

Table 8. 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

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 the 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 $\overline{\beta}$ and for the weights of the imitation effect and the coordinated consumption effect, c_1 and c_2. The problem 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 closely match the actual decision making of the movie goers. 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 most adhere to reality is defined calibration [44]. We decide to use the empirical results of the survey (section 3) in order to conduct a micro calibration 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.

First, we investigate the consequences of the relation between social orientation and attendance. In section 3 we have shown that movie visitors that decide more according to their individual preferences tend to visit cinema theaters more often than customers that are more socially oriented. We formalize this correlation deriving a new probability of attendance r_{it} (11) and we substitute this to the previous probability of attendance p_t. We set the model with the previous parameters' setting (β_i=[0.25, 0.75]; m_j=[0, 1]; ω_1=50,000,000 and δ_1=0.5) and compare the results of these simulation runs (Table 9) with the previous ones (Table 8). 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* of about 1%

which appears to be relatively small compared to the effects of imitation and coordinated consumption.

$$r_{it} = \begin{cases} \overline{\beta} \geq \beta_i \Rightarrow p_t + \left(\overline{\beta} - \beta_i\right) \cdot \left(1 - p_t\right) \\ otherwise \Rightarrow p_t + \left(\overline{\beta} - \beta_i\right) \cdot p_t \end{cases} \tag{11}$$

Table 9. GINI coefficient values when r_{it} is proportional to β_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

Second, we investigate the consequences of the relation between social orientation and the movie genre. In section 3 we have shown that movie goers that visit popular movie types like animation/family, comedy, thriller/adventure/action/fantasy tend to report a stronger social orientation than those visiting more niche movie types like drama and biography/history. A simple way to include this correlation in our simulation model is to relate the value of movie characteristics m_j to the social orientation of the agents. In particular, we can assume that niche movie types tend to meet the extremes of the continuum of agents' preferences. This can be formalized in our model moving the value of m_j towards the extremes of the continuum according to the deviation of β_i from $\overline{\beta}$ (12). The parameters' setting for our model is kept the same so that the results of Table 10 are comparable with those presented in Table 8. We notice that the implemented correlation between m_{ij} and β_i slightly decreases market inequalities for low values of c_1 and c_2, and it slightly increases market inequalities for high values of c_1 and c_2. However, also in this case, these effects are minor and very marginal with respect to the effects of imitation and the coordinated consumption.

$$m_{ij} = m_j \pm \left(\beta_{MAX} - \beta_i\right) \cdot m_j \tag{12}$$

Table 10. GINI coefficient values when m_{ij} is proportional to β_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	0.506	0.523	0.531	0.536	0.539
c_1 =0.3	0.514	0.527	0.533	0.537	0.540
c_1 =0.5	0.517	0.528	0.535	0.538	0.539
c_1 =0.7	0.520	0.530	0.534	0.538	0.541
c_1 =0.9	0.521	0.530	0.534	0.539	0.542

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 in order 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 towards entertainment consumption and a segment oriented towards art consumption. The former segment, in prevalence composed by males, younger and less educated visitors is strongly socially influenced; it mainly visits mainstream movies whose genres usually are comedy, thriller and action; and it does not visit cinema theaters too often. The latter segment, characterized by females, elder and higher educated visitors, is less socially influenced; it visits more art house movies whose genres are more often drama and biography; and it goes more often to the cinema. Obviously caution is needed with interpreting these findings as they represent a strong generalization of the cinema consumption. However, they can easily feed our simulation model furnishing useful insights.

The results of our simulation model show that market inequalities are strongly determined by the segment oriented towards entertainment consumption –which scores high on social orientation– rather than by the segment oriented towards art consumption –which scores low on social orientation. When movie goers perceive cinema as entertainment, their decisions depend more strongly on what other movie goers decide to do. In these cases, the decisions of movie goers converge towards 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 differences 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] that find that informational influence (i.e., similar to imitation effect) more strongly influences 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 visit movies together in order to maintain social relationships and to maintain and improve their self-concept. These normative influences appear to have a strong influence on visitors' behavior. Especially when movies are visiting 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 influence 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 explain the reasons why big studio producers tend to prefer a platform strategy respect to a sleeper strategy [18]. Big studios prefer to heavily advertise movies before their release in order to convince large groups of movie goers to visit 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 with a few cinema screens and then relying on the positive word-of-mouth of the movie that ignites the imitation effect.

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