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Ich Bin Auch ein Lemming: Herding and Consumption Capital in Arts and Culture

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Abstract: Trends in arts and culture tend to be longer-lasting and less fragile than in other fields such as clothing design. Most herding models are not able to explain such stability, instead predicting informational cascades to be fragile and fads to be frequent. The present contribution is able to explain the hysterisis of trends in arts by incorporating the accumulation of consumption capital into a herding model. Further, the model is tested empirically by analyzing measures of relative and absolute concentration in the television business. It is concluded that by being exposed to art and culture people accumulate consumption capital for a particular style or artist and that this mechanism tends to make herding in arts stable over time.

Keywords: Art, Culture, Herding, Consumption Capital, Concentration.

JEL-Classification: C11, D82, D83, Z11.

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1. Introduction

A scene in the movie *Moscow on the Hudson* shows the lead character (played by Robin Williams) observe a long line of people waiting on the sidewalk on a snowy winter evening, and first join the queue, only later asking what the line is actually for. Toilet paper, it turns out. In Russia, where long lines for the most basic products were ubiquitous even in the 1980's, Williams' act makes perfect sense—simply the presence of people waiting is a good indicator that there is something worth waiting for—and he ignores other factors such as the cold, his exhaustion after a long day, etc. Yet similar behavior makes little sense under other circumstances. Why, for example, do people line up for hours to be among the first to buy the latest installment of Harry Potter when it goes on sale at the stroke of midnight? There is no shortage of either this book, or books in general, and the book can be easily acquired one or two days later without the cost of waiting in line. Similarly, such is the hysteria surrounding certain special exhibitions that people wishing to secure tickets will sometimes queue up overnight to obtain entrance. Whereas the consumption of the Harry Potter book, once acquired, has no congestion costs, it should be apparent to the multitudes standing in line for the exhibit that overcrowding very likely awaits them inside, rendering a deep experience of the art humanly difficult. Simultaneously, it is not unusual to find that certain smaller special exhibitions and even the permanent galleries in a museum with an oversubscribed show are quite empty.

Herding phenomena are not restricted to arts and culture, but occur equally in many other parts of life, such as for example in fashion and in financial markets. However, some features of herding phenomena in arts and culture seem distinct. While in fashion predominant colors and materials alter every season and while stock market trends change even more frequently, in arts and culture trends tend to be longer-lasting and more persistent. Music genres and bestselling musicians for example tend to stay en vogue for many years, television programming trends can last for decades and the most successful special exhibitions in museums focus on the same topics as twenty years ago. Rap, Rock, Madonna, Mozart, Ernest Hemingway, Harry Potter, Soap Operas, Medical Dramas, Egyptian mummies and Impressionist art have been popular for decades and are likely to remain so for much longer.

In order to understand phenomena such as those described above, this paper examines herd behavior in the cultural sphere. We alter traditional models of informational cascades such as that in Bikhchandani, Hirshleifer and Welch (1992) by including consumption capital as theorized by Stigler and Becker (1977) and later Becker and Murphy (1988), allowing us to model the habit formation induced by crowd decisions. Through this addition and modification of several minor conditions, we predict fundamentally different dynamics of mass behavior in the context of museum exhibitions and other forms of cultural consumption as opposed to traditional financial or commodity-oriented contexts. Established models of fads and fashions predict brittle cascades vulnerable to slight alterations in underlying conditions, which have a higher probability and speed of settling into a 'correct' cascade with public information releases. We show that due to the accumulation of consumption capital, cascades in arts and culture are self-reinforcing and in the long-run become virtually indestructible. This leads to frequent cases of hysterisis—a concept meaning a state outside of equilibrium from which it is nevertheless extremely hard to exit. We test our model for concentration in TV programming using data for the period 1961-1989.

Our findings have important implications for museum policy in the realm of content programming and accessibility strategies. In particular, we offer several solutions in the area of exhibition and museum entrance pricing, some to help alleviate congestion due to cascades and one that is powerful enough to break a cascade. More broadly speaking, our findings are also relevant for models of social behavior, which always has components of private and public information together with crowd-induced behavior.

The rest of this paper is organized as follows. Section 2 sets out the cultural context of art exhibitions and consumption capital, and provides a brief review of the relevant economic literature. Section 3 discusses our theoretical model. Section 4 contains the empirical analysis of TV programming, while section 5 suggests policy solutions and their predicted effects. Section 6 discusses possible extensions of the model and areas for future research.

2. Context and Literature

The model constructed in the present contribution is general enough to capture a broad range of phenomena in several fields of arts and culture. Choices between different styles of paintings, different genres of music, different cinema movies, different kinds of architecture, different approaches to design or different categories of TV programs all involve uncertainty, imperfect information and some private signals. In all those cases people extract information from observed actions of others and issues of social learning are important. To illustrate the model in an intuitive way we will focus on the case of decision taking for visual art exhibitions in museums.

Herding behavior in the high arts can be aptly observed in the case of special exhibitions. Unlike permanent collections in museums, which display art from a diverse range of styles and artists and are essentially always accessible, special exhibitions are characterized by limited duration, usually no more than 6 months, and a distinct identity within the museum

space, as well as usually a focused theme. Hence figures of exhibit attendance are an indicator of visitor preferences that allows precise analysis.

According to the Smithsonian Office of Policy and Analysis (2001: 5), "An exhibition is an organized, self-conscious display." Exhibitions that present an essentially identical set of objects in each of several venues are known as traveling exhibition. Traveling exhibitions are a relatively recent phenomenon, born in the 1970's thanks to better and cheaper opportunities to transport art. Since then, special exhibitions have proliferated to the point that no self-respecting museum hosts fewer than two or three a year, and in a city like New York or Washington, there are several, if not a dozen major shows on at once.

High arts demands specialized consumption skills which can be acquired only through a combination of past experience and conscious investment—learning. When visitors attend special exhibitions, which nearly always have a narrow thematic focus—a particular artist, a subject theme as examined by a particular artistic movement—they acquire consumption capital and skills for the art featured in the show. However, their readiness and capacity to experience other art in the museum's permanent collection is little improved, making them no more likely to return for any other reason than another special exhibition of the same type of art.

The situation is similar, though perhaps less dramatic, in other fields of culture such as music, literature, television or cinema, where consumption capital is involved as well. Indeed, the model presented in the next section predicts persistent herding in those fields, and will be empirically tested.

The present contribution is embedded in three separate fields of economic literature. First, we build up in our analysis on the growing literature in the economics of arts and culture. Among the important contributions in this literature are the ones by Baumol and Bowen (1966), Frey and Pommerehne (1989), Peacock (1993) and Caves (2000). Several articles in the economics of arts focus particularly on museums (Feldstein, 1991; Grampp,

1996; Stanley et al., 2000; Winestein, 2002; Frey and Vautravers-Busenhart, 2003; Maddison and Foster, 2003) and on television programming (Hoskins et al., 1997).

Somewhat related to these contributions in the economics of arts is the research about consumption capital, pioneered by Stigler and Becker (1977) and Becker and Murphy (1988). Their analysis will be used in the present article for modeling the stability features of herding in arts.

The third important field of economic literature used in the present contribution refers to social learning and herding (for an overview see Chamley, 2004). Our basic modeling framework is similar to the one used in the pioneer work of Bikhchandani, Hirshleifer and Welch (1992). Their contribution emphasizes a situation where at a certain point people begin to ignore their private information and start to herd, i.e. to follow the actions of those ahead of them in the line. In their model no social learning takes place from the third player onwards, and all further players are in the same situation, creating an informational cascade that produces rational herding. However, the direction of herding is fragile as one single "black sheep" can stop the herd and lead to a new fad. Another important paper is that of Banerjee (1992), which uses a somewhat different model. After these early studies, herding papers have focused on issues such as the possibility of incorrect herds (Smith and Sorensen, 2001), the speed of convergence (Vives, 1993), the changing state of the worlds (Moscarini, Ottaviani and Smith, 1998) and experimental testing of the implications (Anderson and Holt, 1997).

However, as far as we know few investigations have focused on explaining long-lasting fashions and hysterisis and almost no research has applied herding frameworks directly to arts and culture. One notable exception is Kennedy (2002) who analyses herd behavior in programming decisions by major US TV channels. However, Kennedy does not build a formal herding model and he clearly has a very different focus than us. His "Industrial Organization" framework emphasizes the choice of the main television channels in the US between innovation and imitation (herding). By contrast, in our framework we focus on the

behavior of the consumers and are concerned with the stability features of herd movements in arts and culture. Simultaneously, we provide a dynamic exploration of the superstar effect, as well as a new theoretical grounding for it.

3. The Model

Our theoretical framework can be applied to all sorts of phenomena in arts and culture in which consumption capital is involved and where people take sequential decisions based on private and public information. For reasons of simplicity, we will discuss our framework for the specific example of the visitor's choice between two different special exhibitions.

Each visitor of the museum has the choice between spending the time of her visit in one of two temporary exhibitions at a museum. For the sake of the argument, say that the decision is between a show of old master art and a show of impressionism. A visitor does not know which of the exhibitions she will like more. In making her choice, she takes into account her private information, i.e. her signal, and the public information, i.e. the observable decisions of all other visitors before her. It is assumed that only the decision of the other visitors can be observed, but not their signal. Further, a unique queue is assumed, where people enter the museum sequentially and where the position in the queue is randomly drawn.

The private signal corresponds to a "prejudice" of the visitor about which kind of art will be more enjoyable. The signal is assumed to be binary, either M or I. A signal of M means that the paintings of old masters are expected to be more enjoyable, and a signal of I means that impressionist paintings are expected to be preferred. Initially the signals M and I are randomly drawn with equal probability. Expressed differently, the objective probability π of obtaining a signal M equals 0.5. Intuitively, this means that no style of art is objectively better than the other.

The visitor does not know the probability with which signals occur but believes that they are somewhat informative. More precisely, visitors believe that a signal of M means that a particular visitor will prefer with probability $p \geq 0.5$ paintings of old masters and with probability (1-p) paintings of impressionist artists. Conversely, visitors believe that a signal of I means that she will prefer impressionist paintings with probability $p \geq 0.5$, and old master art with probability (1-p). Note that for simplicity we focus on the special case of a "symmetric binary signal" where both binary signals are assumed to be equally informative, i.e. where p takes the same value for both cases. This simplification does not restrict the generality of the results (see Chamley: 24ff).

It is important to remember the conceptual difference between the variables π and p. The former corresponds to the *objective* distribution of the signals M and I, i.e. both signals occur initially with equal chances in the present framework. The latter refers to the *subjective* precision visitors confer to the signals. Even though objectively the signal contains no information about the quality of the different kinds of arts (as both M and I occur with the same probability), visitors have prejudices about the quality of the different exhibitions or collections. Therefore, they believe their private signal to be somewhat informative with a probability of $p \geq 0.5$. Thus, one can see p as precision attributed by the visitors to the signals, or more intuitively as the value attributed to prejudices.

In contrast to numerous other herding models, it is not assumed here that one option is a priori better than another. Therefore, herding does not lead to inefficiency per se. The problem in our framework is not that the "true value is not found" or that the "wrong option is chosen." Rather, the concentration of visitors on one exhibit or the other can lead to overcrowding, which could damage viewer experiences and in the long run can discourage them from museum attendance, as well as prevent them from building up cultural capital. Also troubling are the long run implications for artistic diversity, since people will tend to

build up a very specialized cultural capital, and might not appreciate new and different kinds of art.

It is important to note that the aim of the present contribution is to assess why trends in arts are less volatile than in other fields such as fashion and why one can expect to see increased concentration in arts. Thus, we do not focus on the more normative question of whether increased concentration is a problem or not and will accordingly only treat this issue and the related policy implications very briefly.

The main building blocks and features of our model are straightforward. The different visitors all have some idea about which exhibitions they would prefer (private information), and they think that this signal is somewhat but not perfectly informative. Therefore they observe the choices of the previous visitors in the queue and try to extract information about their own signals by using Bayesian updating. The first visitor in the queue chooses an exhibition according to her private information, deciding in favor of the Old master show if she receives signal M and in favor of the Impressionist show if she receives signal I. The second visitor can only observe the decision (and not the signal) of the first visitor, but thanks to the fact that the first visitor takes a decision solely on the basis of her own signal, the second visitor can infer her predecessor's signal by observing her action. If the signal of the second visitor is the same as that of the first visitor, she will follow her private information. However, if her signal is contrary to that of the first visitor, the two cancel each other out and the second visitor randomizes between her two choice options.

If the second visitor chooses differently from the first visitor, the third visitor knows that the first two signals were opposed and cancel each other out. Therefore, the third visitor is in the same situation as the first visitor and simply follows his private information.

By contrast, if the first two visitors have chosen the same exhibit, the third player will cascade—i.e. choose the same section as the first two visitors, irrespective of his private signal. To illustrate this, consider the case where visitors 1 and 2 have chosen the

Impressionist exhibition and visitor 3 receives the signal M. Visitor 3 knows for sure that visitor 1 has received a signal I, which cancels out his own signal. Moreover, he knows that visitor 2's choice to attend the Impressionist exhibition can either be due to having received a signal I or to randomization. As the probability of visitor 2 having received signal I conditional on choosing I is higher than the probability of her having received signal M conditional on choosing I, visitor 3 will ignore her private information and will in any case choose the Impressionist show[1].

Accordingly, every time two consecutive visitors choose the same section, herding will start and all remaining visitors will follow them.

The unconditional ex ante probabilities of herding towards old masters, of no herding and of herding towards impressionism are shown in equations (1a), (1b), and (1c) respectively.

(1a) $\frac{1}{2}-\frac{(\pi(1-\pi))^{n/2}}{2}$

(1b) $[\pi(1-\pi)]^{n/2}$

(1c) $\frac{1}{2}-\frac{(\pi(1-\pi))^{n/2}}{2}$

where, π=probability that the signal will be M, n=number of visitors.

For the purpose of illustration, we can briefly discuss the case of two visitors. For our assumption of initially π=0.5, the probability that both people watch the old masters is 3/8.

[1] This result is obtained through Bayesian updating and is well explained in Bikhchandani, Hirshleifer and Welch (1992) and Chamley (2004).

Thus, with this probability, from the third visitor on, everybody will herd to the old masters. Similarly, the probability of herding towards impressionism is also 3/8. The probability that players choose different sections and that after two periods herding does not occur is 1/4.

The higher the number of visitors (n) is, the more likely it is that herding in either direction occurs. In the limit, for n going to infinity, herding always occurs.

In the original model of Bikhchandani, Hirshleifer and Welch (1992) the observed informational cascades and herding are fragile and one single "black sheep" can break down a herding outcome and can lead to a fad. This accurately describes what happens for example in fashion and in financial markets. Arts and culture, however, are characterized by the persistence and relative stability of trends. We can capture this hysterisis in our model by making the herding-game repeated and by making the probability π in period t depend on the outcome in period t-1. It is reasonable to assume that people build up consumption capital of knowledge. Through a process of learning, visitors learn to appreciate a certain kind of art after having spent time and effort trying to understand it. Or to put it differently, if a given visitor has already seen several exhibitions on, say, impressionism, he is more likely to receive a private signal I again, as he has learnt in the past to appreciate the history, the philosophy and the main concepts of impressionist art. This is similar but not congruent to the idea of the consumption technology in Gary Becker's work, where the household becomes more adept at producing arts appreciation.

In the present model these ideas are represented in the following way. As shown in equation (2), π, the probability of the signal being M, depends positively on the amount of knowledge of the relevant kind of art. In our case of the old masters, a higher relative consumption capital in old masters' art will increase the likelihood of the signal being M.

$$(2)\quad \pi(t) = \pi\left[\frac{k_m(t)}{k_I(t)}\right]^{+}$$

where π=probability that the signal will be M, k_m=consumption capital in old masters' arts, k_I=consumption capital in impressionist art, t=time.

The accumulation and de-cumulation of consumption capital in a particular form of art (in our case the old masters' art) can be represented as done in equation (3). It is analogous for impressionist art.

$$(3)\quad \dot{k}_M(t) = \frac{\Delta k_M(t)}{k_M(t)} = \frac{m k_M(t)}{k_M(t)} - \frac{\delta k_M(t)}{k_M(t)} = m - \delta$$

where m=visit in the old masters' collection in the current period t, δ=depreciation rate of consumption capital in arts. We have: $m > \delta > 0$.

The variable m is binary, takes the value m when the visitor visits the old masters' exhibition in period t and takes the value 0 if she visits any other exhibition. Additionally, the existing stock of consumption capital of a particular art style depreciates at a rate of δ. As $m > \delta > 0$ and as $\pi \leq 1$, consumption capital of a given style of art is always accumulated if in the same period an exhibition of this same style of art is visited. By contrast, if another exhibition is visited, m becomes zero and only the depreciation term remains. In this case, consumption capital is de-cumulated.

Including consumption capital in the basic framework makes the herding outcome more robust than it is the case in the original article of Bikhchandani, Hirshleifer and Welch (1992). Due to the inclusion of consumption capital in arts, the herding and cascading outcome becomes less fragile and fads become less likely. More specifically, as far as art is concerned, our model predicts a strong concentration on very few artist and time periods of

art being exposed. This loss of diversity represents a major problem if a large variety of expression is taken to be an essential and valuable component of culture.

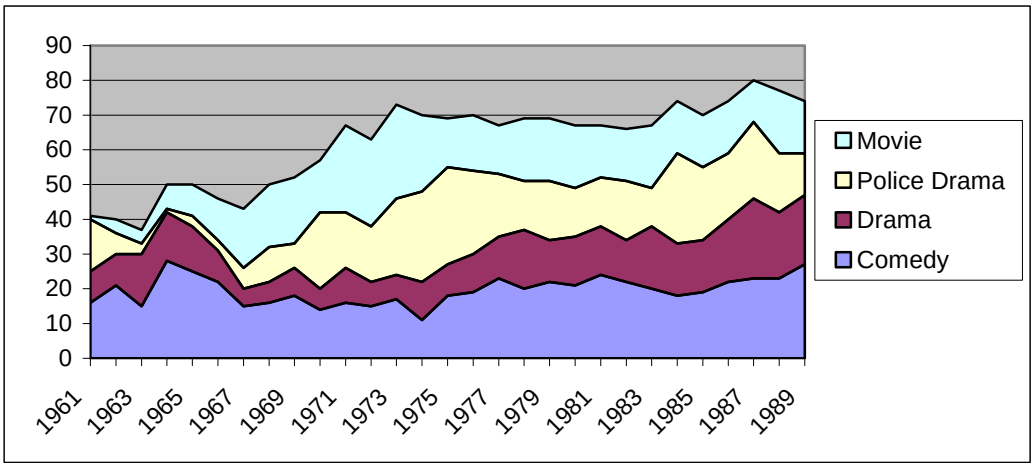
4. Empirical analysis of herding in television programs

As stated before, the present model applies to all spheres of arts and culture. Therefore we can focus on testing the predictions of the model to one field in which data is readily available. This is the case for the television programming business.

Some experience is needed for fully appreciating different types of TV shows. Western, police dramas or quiz shows for example follow an internal logic and a part of the entertainment is provided by the fact of understanding the history and main features of these genres. Thus, similar to the case of the arts, it seems reasonable to talk in the field of TV genres of consumption capital accumulation. Therefore, following our model presented in the previous section, we should expect stable herding in this field. Initially, the choice between watching different TV categories might have been randomly taken, but our model predicts that trends should on the whole be stable and reinforcing. Or to put it differently, big categories should become bigger and small categories smaller, and we should observe increased concentration. Further, it is reasonable to assume that TV markets are competitive and that producers know quite well what people want to see and broadcast shows that attract a large audience.

Our herding model will be tested using data provided by Kennedy (2002). The data includes the percentage of shows by category of programming in the USA from 1961 to 1989. Fifteen different categories are included, namely comedy, drama, police drama, variety/music, news, quiz, adventure, movies, anthology, westerns, sports, cartoons, medical, science-fiction and other.

Figure1: Evolution of the four biggest television show categories



Source: Data from Kennedy (2002).

As displayed in figure 1, the four biggest categories have increased more and more over the period analyzed. In 1961 they accounted together for 41% of the programming time, while in 1989 they achieved 74%. At the same time the percentage share of the four smallest categories (Quiz, Sports, Cartoons, Science-Fiction) decreased from 10% to 5% (not shown in the figure). This concentration increase and the stability of the herding correspond to what is predicted by our model. However, in order to analyze the whole picture we will discuss the evolution of measures of absolute concentration (Herfindahl-Index) and of relative concentration (Gini-Index).

Figure 2 shows that the values of the Herfindahl-Index for the different years increased significantly from 1961 to 1989. The straight line corresponds to the trend. In 1961 this index had a value of 0.108 whereas in 1989 it amounted to 0.156. One can thus conclude that the absolute concentration in the field of TV programming increased.

Figure 2: Evolution of the Herfindahl-Index

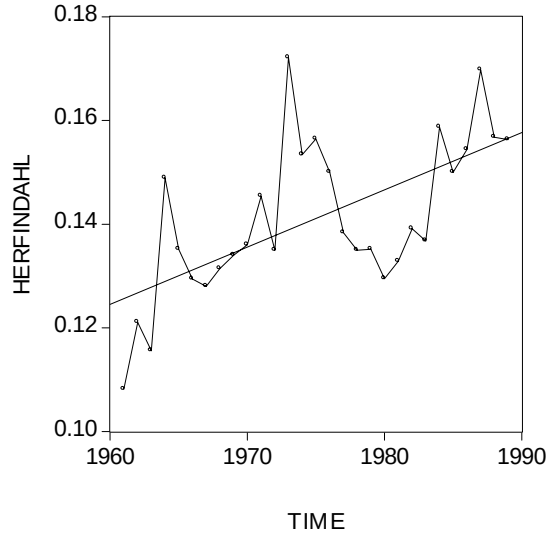
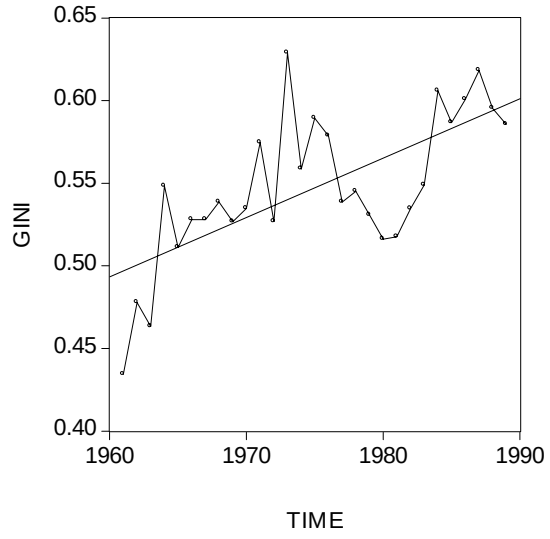


Figure 3 shows the evolution of the relative concentration of TV programs among relatively few categories, measured with the help of the Gini-Index. The values of this index increased from 0.434 in 1961 to 0.586 in 1989. We thus observe an increased value also for relative concentration.

Figure 3: Evolution of the Gini-Index



5. Policy Implications

The present contribution analyzes the mechanisms making trends in arts and culture long-lasting and persistent. The observed process of concentration can lead to less diversity in styles and artists andcan result in congestion. Whether this is problematic is a normative question to be answered by the political decision process rather than by scientific analysis. However, to illustrate the real-world implications of the issues treated in the present contribution, we discuss what measures could reduce herding and concentration in arts – if this was a policy goal.

Normally in museums people pay *before* entering and a herding effect is likely to occur. In contrast, with a system of people *paying on their way out* the herding result would be eased. This could be implemented in a similar way to a parking garage. At the exit, visitors pay a ticket price related to time spent inside. Allowing people to pay on the way out rather than upfront would reduce almost entirely the cost of a "wrong decision". Thus, the visitor could quickly leave an exhibition that did not bring her pleasure without having lost anything in the process, and go to another exhibition. Therefore, she would not have to observe others' behavior at all. In particular, she could obtain information about her own preferences from the experience during the first 5 minutes, and then decide whether to switch to the other exhibition. If the first few minutes are free or if visitors show a "love of variety", herding would not take place anymore at all. Also, in this case, unless an exhibition is extremely congested, much of the waiting (if any) would happen at the end of the show, but still inside, whereas in other exhibitions, much of the waiting is done on the sidewalk or in a waiting area, which has no redeeming cultural value.

Another possibility is represented by the *inclusion/non-inclusion of special exhibitions in museum memberships*. Museums could offer different membership packages not in terms of size (i.e., individual, pair, family etc memberships), but benefit combinations. Examples are:

1) Free entry to permanent collection, plus half price rate to special exhibits 2) free entry to permanent collection, plus free off-peak admission to special exhibits 3) free entry to permanent collection and special exhibits. 4) free entry to permanent collection, special exhibits, all special events (such as concerts). Through different pricing schemes and packages the permanent collection can be made more or less attractive compared to special exhibitions and the number of visitor number of different special exhibitions can be regulated.

6. Conclusion

The present contribution discusses the conditions under which herding occurs in arts and culture and when the direction of herding is stable and persistent. After a brief introduction, a short treatment of the context and a review of the literature a simple model of herding behavior is constructed. The novel contribution of our model lies in the inclusion of consumption capital in arts and culture which makes herding more stable and less fragile than in most standard herding models. In our framework herding becomes almost indestructible and hysterisis takes place.

This result is then empirically tested for television programming. The empirical evidence is consistent with our conclusions. There is an increased concentration among the different genres of television programs and a stable dominance of always the same genres.

The present contribution highlights the presence of long-lasting herding phenomena for the particular cases of arts and culture and provides empirical evidence for the relevance of our model. Further research in this field is still needed. In particular, an empirical assessment of our model for different fields of culture would be welcome.

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