Intern. J. of Research in Marketing 28 (2011) 248–257

Contents lists available at ScienceDirect

Intern. J. of Research in Marketing

journal homepage: www.elsevier.com/locate/ijresmar

Empirical regularity in academic research productivity patterns in marketing

Debabrata Talukdar [a,*], Vijay Ganesh Hariharan [b,1], Chanil Boo [c,2]

[a] Marketing Department, School of Management, State University of New York at Buffalo, Buffalo, NY 14260, USA
[b] Department of Business Economics, Erasmus School of Economics, Erasmus University, 3000DR Rotterdam, The Netherlands
[c] Department of Marketing, Kenan-Flagler Business School, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, USA

ARTICLE INFO

Article history:
First received in 25, January 2010 and was under review for 4 months
Available online 12 July 2011

Area Editor: Peter C. Verhoef

Keywords:
Scientific productivity
Bibliometric distributions
Lotka's Law
Empirical regularity
Cumulative advantage
Author concentration

ABSTRACT

In any academic discipline, published articles in their respective journals represent "production units" of scientific knowledge, and bibliometric distributions reflect the patterns in this productivity across authors or "producers". We use a comprehensive data set from 11 leading marketing journals to examine whether there is any empirical regularity in the patterns of research productivity in the marketing literature. Our results present strong evidence that there is indeed a distinct empirical regularity. It is the so-called generalized Lotka's Law of patterns in scientific productivity: the number of authors publishing n papers is approximately $1/n^c$ of those publishing one paper. We find the empirically estimated value of the exponent c to be 2.05 for the overall bibliometric data across the leading marketing journals. For individual journals, the estimated values of c range from 2.15 to 2.83, with lower values indicating higher authorship concentration levels. We also find that variations in authorship concentration levels across journals and over time are driven by a journal's maturity, its topical focus, its attractiveness as a publication outlet, the characteristics of its review process, and the extent of author collaboration present in the journal. We discuss the general implications of our findings.

1. Introduction

In any academic discipline, published articles in its respective journals represent "production units" of scientific knowledge, and their bibliometric distributions reflect the patterns in this scientific productivity across authors or "producers" (Coile, 1977). One of the most influential and well-known studies on the patterns of scientific productivity is the seminal paper by Alfred Lotka published in 1926 (Huber, 2002; Lotka, 1926), in which he investigated the bibliometric distributions of published articles by chemists and physicists. After analyzing the number of publication contributions by chemists listed in *Chemical Abstracts* and by physicists listed in Auerbach's *Geschichtstafeln der Physik,* he observed that the number of authors making n publication contributions is approximately $1/n^2$ of those making one and that the proportion of all authors making a single contribution is approximately 60%. These empirical findings have become known as Lotka's Law of scientific productivity, which is analytically summarized by the following equation (Chung & Cox, 1990):

$$a_n = a_1 / n^2, n = 1, 2, 3, \ldots, \quad (1)$$

where a_n and a_1 are the number of authors with n publications and one publication, respectively.

Since Lotka's study, several researchers have investigated the degree of conformity of Lotka's Law with the empirical reality in the patterns of scientific productivity in several academic disciplines and in their respective leading disciplinary journals (Cox & Chung, 1991; Huber, 2002). These studies also use Lotka's Law to draw inferences about the relative extent of the phenomenon of success-breeds-success in academic publication outcomes. Specifically, this phenomenon is considered to be more pronounced in an academic discipline when bibliometric distribution patterns exhibit high authorship concentration levels within the discipline (Chung & Cox, 1990). The academic disciplines investigated by these studies include accounting, business ethics, computer science, economics, finance, humanities, information science, library science, and medical science (Talukdar, 2011). Surprisingly, a search of this literature stream reveals the conspicuous absence of an analogous comprehensive study in the academic discipline of marketing.

In this study, we specifically investigate the following inter-related questions: Do we find evidence of any empirical regularity, as suggested by Lotka's Law, in the bibliometric distribution patterns of leading marketing journals? How do authorship concentration levels reflected in such distribution patterns vary across journals and over time? What are the factors that drive this variation in authorship concentration levels? What do the observed authorship concentration levels imply about the extent of the phenomenon of success-breeds-success in publication outcomes in the marketing discipline? How do

* Corresponding author. Tel.: +1 716 645 3243.
E-mail addresses: dtalukda@buffalo.edu (D. Talukdar), hariharan@ese.eur.nl (V.G. Hariharan), chanil_boo@unc.edu (C. Boo).
[1] Tel.: +31 10 408 2542.
[2] Tel.: +1 716 713 6503.

0167-8116/$ – see front matter © 2011 Elsevier B.V. All rights reserved.
doi:10.1016/j.ijresmar.2011.03.003

Table 1
Scope of the data used in this study.

Selected journals	Inaugural year	Issues covered	Years covered	Number of papers published	Number of distinct authors
International Journal of Research in Marketing (IJRM)	1984	v1(1), 1984-v26(4), 2009	26	657	958
Journal of the Academy of Marketing Science (JAMS)	1973	v1(1), 1973-v37(4), 2009	37	1238	1649
Journal of Consumer Psychology (JCP)	1992	v1(1), 1992-v19(4), 2009	18	443	620
Journal of Consumer Research (JCR)	1975	v1(1), 1975-v36(4), 2009	35	1432	1409
Journal of Marketing (JM)	1936	v1(1), 1936-v73(6), 2009	74	2575	2547
Journal of Marketing Research (JMR)	1964	v1(1), 1964-v46(6), 2009	46	1947	1921
Journal of Retailing (JR)	1925	v1(1), 1925-v85(3), 2009	85	1974	1902
Management Science[a] (MGS)	1954	v1(1), 1954-v55(12), 2009	56	692	934
Marketing Letters (ML)	1989	v1(1), 1989-v20(4), 2009	20	501	964
Marketing Science (MKS)	1982	v1(1), 1982-v28(6), 2009	28	783	858
Quantitative Marketing & Economics (QME)	2003	v1(1), 2003-v7(4), 2009	7	99	180
All selected journals combined	n.a.	n.a.	85	12,341	8247[b]

[a] Since *Management Science* is an interdisciplinary journal, and because the focus of our study is on the marketing discipline, our data for *Management Science* consist of only those papers that focus on marketing.
[b] The total number of distinct authors for the combined category is not the same as the sum of distinct authors across the relevant underlying journals, because many authors have published papers in *at least two* of the underlying 11 journals. For example, we find that 3369 (41%) of the 8247 authors across all the 11 journals have published in at least two of the 11 journals.

the leading marketing journals compare in terms of this phenomenon? How do they compare to the leading journals in related business management disciplines such as economics and finance?

The goal of our study is to undertake the most comprehensive investigation of any empirical regularity in research productivity patterns in the academic discipline of marketing. Table 1 shows the scope of our study in terms of the journals and time periods covered. Our study covers 11 journals in the marketing discipline that have been identified in recent studies (e.g., Mittal, Feick, & Murshed, 2008; Stremersch, Verniers, & Verhoef, 2007) as the leading journals for marketing scholars. For each journal, our study encompasses all research articles published in all marketing topical areas from the launch of the journal to a very recent date (December 31, 2009). As Table 1 shows, it is pertinent to note that two of these 11 leading marketing journals were inaugurated in 1925 and 1936, whereas seven of these journals have only been in publication since the 1970s. Compared to journals in related business disciplines such as economics and finance (Chung & Cox, 1990; Cox & Chung, 1991), most of the leading marketing journals are thus relatively "young".

Although there are several studies on the citation and financial impacts of scholarly publications (e.g., Hoffman & Holbrook, 1993; Mittal et al., 2008; Stremersch et al., 2007) and on individual scholar's publication performance (e.g., Diamantopoulos, 1996; Seggie & Griffith, 2009) in the marketing area, that of Eaton, Ward, Kumar, and Reingen (1999) is the only study in marketing to systematically test for empirical regularity in bibliometric distribution patterns as postulated by Lotka's Law. However, its scope is limited, as it focuses on investigating the bibliometric distributions only in one specific subset of topical areas within a small set of journals over a limited time span. Specifically, it analyzes publications only in the consumer behavior research area and considers just four journals — *Journal of Consumer Psychology*, *Journal of Consumer Research*, *Journal of Marketing*, and *Journal of Marketing Research* — and only over the time period 1977 to 1996. Furthermore, it does not analyze the bibliometric distribution patterns of individual marketing journals and thus how those journals compare to other leading journals within the business management discipline. Due to the narrow scope of its data set and analysis, the study by Eaton et al. (1999) yields limited insights into research productivity patterns in the marketing discipline and their implications.

The contributions of our study to the literature are of relevance and interest to both the broader academic community and the academic marketing community. For the former, the findings of our study are important for understanding the nature of research productivity patterns across diverse academic disciplines and whether any empirical regularity is embedded in such patterns. If our study can find evidence that the research output patterns generated by thousands of individual researchers in a younger academic discipline exhibit the same type of empirical regularity as found in much older disciplines, it will point to a remarkable consistency in the underlying scientific knowledge creation process across diverse academic disciplines. As for the academic marketing community, the answers to our research questions are naturally of particular relevance to understand the nature of "market concentrations" in its "intellectual marketplace". For instance, evidence of relatively higher authorship concentration levels across leading journals in any discipline may reflect undesirable levels of "entry barriers" to scholarly publications and thus may imply problems in the underlying knowledge creation process (Swanson, Wolfe, & Zardkoohi, 2007). This can stimulate legitimate discussion within the discipline about its doctoral student training, editorial board composition, and peer review process[3] (Grove & Wu, 2007; Hodgson & Rothman, 1999; Laband & Piette, 1994).

The rest of the paper is organized as follows. The next section presents a conceptual framework for our study, and Section 3 discusses the data. Section 4 presents our empirical findings, and Section 5 concludes.

2. Conceptual framework

2.1. A brief review of theories behind bibliometric distributions

Empirical evidence from academic and artistic fields often shows highly skewed distribution patterns of professional outputs among individuals working in such areas (Chung & Cox, 1990). In particular, a distinctive phenomenon is that a significant share of respective professional outputs is contributed by a relatively small number of individuals. Systematic studies of this phenomenon in academic fields have focused on analyzing the extent of skewness in bibliometric

[3] In this context, readers may find the article by Gans and Shepherd (1994) very thought provoking. In this article, the authors cite several specific instances of rejection of papers, which became seminal works in economics. According to Gans and Shepherd, referees and editors tend to show insensitivity to the novel ideas, which may even change the scope of a discipline. They point out Akerlof's seminal paper (1970), "The Market for Lemons: Quality, Uncertainty and the Market Mechanism", as one of several remarkable cases of initial rejection. They observe that initially "journal editors refused the article both because they feared the introduction into economics of informational considerations and because they disliked the article's readable style" (pp. 171).

distribution patterns of respective disciplinary journals (Cox & Chung, 1991). Several studies have proposed theories as to why and what one can expect in terms of the skewed nature of such bibliometric distribution patterns. These theories have taken the forms of both descriptive and analytical explanations, based on behavioral and mathematical or statistical theories, respectively. As for descriptive, behavioral theory-based explanations, two concepts exist in the literature — "sacred spark" and "cumulative advantage".

The sacred spark hypothesis holds that there are intrinsic differences among researchers in terms of their capabilities and motivations to carry out research. Specifically, in any discipline, there is always a small proportion of researchers who "find research exhilarating. No obstacle dampens their zeal and enthusiasm. They devote countless hours to their research projects…..that is essential, if they are to become well published. Simply put, they love doing the work" (Rodgers & Rodgers, 1999). Cole and Cole (1973) coined a term to describe just such persons: "… they have a *sacred spark*, which fuels them to be much more productive as researchers than most of their professional colleagues."

The concept of cumulative advantage was originally developed by Merton (1973) to explain individual advancements in scientific careers. Also known as the "Matthew effect", it is defined as "the accruing of greater increments of recognition for particular scientific contributions to scientists of considerable repute and the withholding of such recognition from scientists who have not yet made their mark" (Merton, 1973). In the related process of cumulative advantage, exceptional performance early in the career of a young researcher allows him/her to attract relatively more resources as well as to earn more relevant experiences that facilitate continued high performance (DiPrete & Eirich, 2006). For example, such resources can be in the form of research funding and/or "release time" from typical teaching responsibilities to focus on research. Similarly, relevant experiences can be in the form of greater insights — both as successful authors and peer reviewers — on how to write research papers that are more likely to meet the quality standards of disciplinary peer review systems.

The above discussions imply that although the sacred spark concept provides the basis for the cumulative advantage concept to act upon, the latter concept is what an academic discipline uses to encourage and reward evidence of "sacred spark" among its researchers. Therefore, in reality, one would expect that the cumulative advantage and the sacred spark concepts combine at the individual level to produce an increasingly skewed aggregate research output distribution over time in favor of a few highly successful researchers in any given discipline. Using individual-level data, Allison and Stewart (1974) test the combination hypothesis in the sociology discipline and find that the two concepts contribute equally to the observed disparity in productivity across researchers over their careers. For aggregate bibliometric data analyses, where it is not possible to disentangle the separate effects of the two concepts, researchers have focused on investigating their combined effects in creating the phenomenon of success-breeds-success in publication outcomes (Cox & Chung, 1991; Huber, 2002). Specifically, a higher level of authorship concentration in a discipline represents stronger evidence for the phenomenon of success-breeds-success in publication outcomes driven by both the sacred spark and cumulative advantage concepts. As for the methodological approach used in this research, most past studies (Chung & Cox, 1990; Talukdar, 2011) as well as this study use the positivist research approach to essentially gain insights into what the empirical reality "is" in terms of the skewed nature of bibliometric distribution patterns and what such skewness implies about the relative degrees of authorship concentration across different disciplines.

Several studies drawing on mathematical and statistical theories have also attempted to model how bibliometric distributions may generate skewed patterns and the best analytical ways to characterize the observed patterns of such distributions (Chung & Cox, 1990). In perhaps the most well-known study in this literature stream, Price (1976) argues that the Polya Urn model provides a sound conceptual basis for the statistical modeling of the earlier-discussed behavioral theory-based phenomenon of success-breeds-success as an underlying explanation for the skewed bibliometric distributions in academic disciplines. The Polya Urn model supposes that the publication outcome "fate" of an author embodies an urn containing red and black balls with a ball being drawn at random at regular intervals (Feller, 1968). At each drawing, the number of balls of the specific color drawn is increased, whereas that of the other color remains unchanged. Therefore, each occurrence of a red or of a black ball increases the probability of a further such occurrence. In other words, success (i.e., a red ball) is rewarded by an increased chance of further success, but failure (i.e., a black ball) is punished by an increased chance of further failure.

The success-breeds-success phenomenon differs from the above Polya Urn model in that a successful outcome increases the chance of further success, but failure has no subsequent effect in changing the probability of failure. Modifying for this difference, Price (1976) uses the Polya Urn model to stochastically represent bibliometric distributions consistent with the success-breeds-success phenomenon. He shows that such a model is governed by the statistical beta function, which can be approximated by a hyperbolic distribution of the type that is widespread in bibliometric distributions and in diverse social science phenomena. In particular, the model is shown to be an appropriate underlying probability theory for the specific pattern of skewed bibliometric distribution postulated by Lotka's Law (Koenig & Harrell, 1995). More recent studies use various other types of stochastic modeling theories to generate and explain the skewed bibliometric distribution pattern postulated by Lotka's Law (e.g., see Huber, 2002).

2.2. Lotka's Law: original postulation and subsequent generalization

As noted earlier, Lotka's Law has emerged as one of the most influential and well known characterizations — based on both theoretical and empirical supports — of the skewed patterns in bibliometric distributions of scientific research outputs (Huber, 2002). Since its publication in 1926, other researchers investigating bibliometric distribution patterns of scientific research outputs have broadened the scope of the original Lotka's Law in (Eq. (1)) by proposing the following generalized version (Chung & Cox, 1990):

$$a_n = a_1 / n^c, n = 1,2,3,\ldots, \tag{2}$$

where a_n and a_1 are as defined earlier in Eq. (1). The parameter c denotes the exponent of the generalized Lotka's Law. As evident by comparing Eq. (2) to Eq. (1), the generalized Lotka's Law represents an inverse power law with exponent c, whereas the original Lotka's Law is a specific form of that inverse power law, viz., the inverse *square* law with the exponent c equal to two. The exponent c captures the degree of skewness and thus the degree of authorship concentration in the bibliometric distribution. Specifically, a smaller value of c indicates a higher degree of authorship concentration and thus a greater strength of the success-breeds-success phenomenon in publication outcomes (Cox & Chung, 1991; Huber, 2002).

Past empirical studies across several academic disciplines have found that as a discipline matures, the value of the exponent c empirically estimated from its bibliometric distribution generally declines and approaches two, as postulated by the original Lotka's Law (Huber, 2002). The rationale is that a discipline typically has more ad hoc topical areas in its early stages. However, as the discipline continues to mature, it experiences the emergence of more focused topical areas that are amenable to specialization and thus amenable to a cumulative advantage process in publication outcomes for authors. Consequently, in looking for disciplinary attribute measures that are

consistent with evidence of maturity in the development of an academic discipline, the empirically estimated value of the exponent c can be quite insightful (Talukdar, 2011).

3. Data

The key elements of the data set selection for this type of study of bibliometric distribution patterns are the journals, the time period, and the topical areas of the publications covered. We focus on the leading research journals in the marketing area. Although the process of identifying the leading journals in any disciplinary area is not an exact science based on unanimous conclusions, generally a consensus emerges among the researchers in a discipline (Seggie & Griffith, 2009). We use recent studies (Mittal et al., 2008; Stremersch et al., 2007) to identify the leading research journals in the marketing discipline. This results in the selection of the following 11 journals: *International Journal of Research in Marketing* (IJRM), *Journal of the Academy of Marketing Science* (JAMS), *Journal of Consumer Psychology* (JCP), *Journal of Consumer Research* (JCR), *Journal of Marketing* (JM), *Journal of Marketing Research* (JMR), *Journal of Retailing* (JR), *Management Science* (MGS), *Marketing Letters* (ML), *Marketing Science* (MKS), and *Quantitative Marketing & Economics* (QME).

Our data for the study consist of all the research papers (articles and notes) in all marketing topical areas published in each of the selected 11 journals from the respective inaugural issues through to the end of December, 2009. As Table 1 shows, such data coverage requires that we collect publication data for over 50-year time periods for three (JM, JR, and MGS) of the 11 journals. Specifically, the publication time periods across the 11 journals selected in our study ranges from 85 years for the "oldest" journal (JR) to seven years for the "youngest" journal (QME). We exclude publications that are comments and rejoinders, and in cases of multiple authorships, we use the "normal count"; that is, each author of an article receives full credit (Chung & Cox, 1990). All together, the data set for our study consists of 12,341 published papers by 8247 distinct authors across the selected 11 leading marketing journals. The final two columns in Table 1 show the breakdown of the data by journal.

For the part of our analysis that investigates how authorship concentration levels evolve over time, we organize the cumulative research output data in Table 1 in incremental growth-steps of 5-year time periods[4] since 1925 (when the first leading marketing journal (JR) was launched). Specifically, for our overall study time window of 85 years (1925–2009), we analyze the cumulative research outputs from the journals individually and as a group over the following 17 incremental time periods: 1925–1929, 1925–1934, 1925–1939,..., 1925–2009. Also, to gain insight into relevant time-invariant and time-variant factors that may explain variations in authorship concentration levels across journals and over time, we collect data on several dimensions of journal-related characteristics that made sense a priori and/or are suggested by the existing research as potential drivers of such concentration levels. As discussed below, the specific five dimensions of journal characteristics that we use are as follows: *Maturity*, *Focus*, *Attractiveness*, *Review Process*, and *Extent of Collaboration*.

Past studies of academic research process find that a "younger" academic discipline or journal typically has more ad hoc topical areas in its early stages (Huber, 2002). As mentioned earlier, the maturation of the discipline leads to the emergence of focused topical areas and a greater cumulative advantage in publication outcomes for authors. This would suggest that the relative maturity of a journal and the scope of its topical focus affect its authorship concentration level. To capture journal maturity, we use the *Age* of a journal in years since its introduction. As for the topical focus of the journals, we follow Lehmann (2005) to classify marketing journals into the following three types by their primary focus — *General Marketing* (*GM*), *Quantitative Marketing Methods and Science* (*QMMS*), and *Consumer Behavior* (*CB*).

Additionally, studies of scholarly publication "markets" suggest that "supplies" (of articles) from the "producers" (or authors) across the "distribution outlets" (or journals) in any discipline vary significantly based on relative academic visibilities and publication acceptance prospects offered by the disciplinary journals (Hodgson & Rothman, 1999). As such, one would expect the authorship concentration level of a journal to be affected by factors that influence authors' perceptions of the relative attractiveness of the journal as a publication outlet. We use the following five variables to capture this relative attractiveness of journals — *Tier*1 (dummy for Tier 1 journals — IJRM, JM, JMR, MGS, JCR, and MS (Stremersch et al., 2007)), *Award* (proportion of years with best paper award(s) since a journal's introduction), *SSCI* (proportion of years since its introduction during which a journal was indexed in Social Sciences Citation Index), *Articles* (average number of articles published per year), and *CJ* (number of other competing journals present in a given time period) (Michaels & Pippert, 1986).

Further, the degree of "entry barriers" to publications in academic journals and thus the authorship concentration levels across journals in any discipline are expected to be influenced by the characteristics of the review process, which is an interaction between authors, editors, and reviewers (Lawrence, 2003). We capture review process characteristics through two variables: *Editors* (proportion of years since journal introduction for which there was more than one editor), and *AE* (proportion of years since journal introduction for which an associate/area/section editor was present).[5] Also, the entry barrier to journal publications is likely to be mitigated through collaboration among authors (Newman, 2001). We capture the effect of how *Extent of Collaboration* affects authorship concentration levels across journals through the variable *Authors*, which measures the average number of authors per paper in a journal.

4. Empirical analyses and results

We organize our empirical analyses as follows. First, we investigate the question of whether Lotka's Law provides a consistent empirical characterization of the bibliometric distribution patterns observed in the selected 11 leading marketing journals. The statistical test used to address this question is the Chi-square goodness-of-fit test between the theoretical frequency distribution of authorship as predicted by the original Lotka's Law and the corresponding empirically observed distributions in our data (Cox & Chung, 1991).

Second, we apply the generalized Lotka's Law to further examine the nature of any empirical regularity in bibliometric distribution patterns in the selected leading disciplinary journals. Specifically, we estimate the best empirical value of the exponent c for each of the selected 11 journals individually and as a group. This is done by statistically fitting the bibliometric distribution function of the generalized Lotka's Law in Eq. (2) to the empirically observed distributions in our data. For this, we note that Eq. (2) can be transformed into its log-linear form and estimated as the following regression model (Chung & Cox, 1990):

$$log\left(a_{njt} / a_{1jt}\right) = -c_{jt}\, log(n) + \varepsilon_{njt}, \tag{3}$$

where a_{njt} is the number of authors publishing n papers in journal j over time period t, a_{1jt} is the number of authors publishing one paper

[4] We chose incremental growth-steps of 5-year time periods because shorter time periods may not be able to capture sufficient levels of cumulative research outputs and because longer time periods will limit the degrees of freedom for our hierarchical empirical analysis.

[5] We consider an AE to be present only when he/she chooses reviewers.

in journal j over time period t, c_{jt} denotes the exponent of the generalized Lotka's Law, and ε_{njt} is an error term. We assume that the error term is distributed normally and independently across journals and time periods, that is, $\varepsilon_{njt} \sim N(0,\sigma^2)$. Third, we compare our results to those obtained from similar empirical studies in related business management disciplines such as economics and finance by fitting the generalized Lotka's Law to relevant bibliometric distributions.

Fourth, we run diagnostic analyses for the observed trends in authorship concentration as estimated through the exponent (c_{jt}) of the generalized Lotka's Law and for potential drivers of such trends. Specifically, we investigate the evolution of concentration levels through a hierarchical regression model and examine whether their variations over time and across journals are systematically influenced by relevant time-invariant and time-variant factors identified in Section 3.[6] The hierarchy of the model is as follows:

$$\begin{aligned} c_{jt} = {} & \beta_0 + \lambda c_{j,t-1} + \beta_1 Age_{jt} + \beta_2 QMMS_j + \beta_3 CB_j + \beta_4 Tier1_j + \beta_5 Articles_{jt} \\ & + \beta_6 Award_{jt} + \beta_7 SSCI_{jt} + \beta_8 CJ_t + \beta_9 Editors_{jt} + \beta_{10} AE_{jt} + \beta_{11} Authors_{jt} \\ & + v_{jt}, \end{aligned} \quad (4)$$

where β_0 is the intercept, λ is the evolution parameter for the exponent c, and β_1 through β_{11} denote the parameters corresponding to each covariate. We assume that $v_{jt} \sim N(0,\boldsymbol{W})$, where $\boldsymbol{W}$ is a 11×11 covariance matrix of error correlations across journals. For parsimony, we assume that the error term v_{jt} is independent across time periods. The system represented by Eqs. (3) and (4) is known as a *Dynamic Linear Model* (West & Harrison, 1997), with Eq. (3) acting as the observational equation and Eq. (4) acting as the evolution equation. We estimate the model by pooling data across the 11 individual journals and the 17 incremental time windows using Gibbs sampler algorithm. Conditioned on $\boldsymbol{W}$, $\boldsymbol{\beta}$, λ, and σ^2, the posterior estimates of exponent c can be obtained through a series of updating steps known as the forward-filtering, backward-sampling procedure (Carter & Kohn, 1994). We assume that β and λ follow normal distributions, σ^2 follows an inverse-gamma distribution, and $\boldsymbol{W}$ follows an inverse-Wishart distribution. We choose proper but diffuse priors for all parameters in our model. We run the sampling chain[7] for 30,000 iterations (15,000 for burn-in and 15,000 for sampling with a thinning of 10).

4.1. The original Lotka's Law: tests and findings

Based on our data set, Table 2 shows the total number of published papers, the number of distinct authors, and the proportion of authors by the number of publications[8] in each of the selected 11 leading journals, both separately and as a group. The highly skewed nature of the publication distributions in each of the journals is immediately apparent from Table 2. Assuming a high competitive demand among marketing scholars to publish in leading disciplinary journals, the skewed publication distributions reflect the significantly lower "odds of success" for *repeated* publications relative to *first-time* publication in those journals. Percentages of authors with just one publication vary considerably, even for those journals introduced during the same time period, for example, 60.2 for JCR versus 73.3 for JAMS. For all the 11 leading journals combined, among 8247 authors, most authors (59.2%) have published only once, and only 12.1% of authors have published more than five papers. This degree of difficulty for multiple publication "hits" in leading journals is similar to those observed in sister disciplines in the business management area. For instance, compared to our finding that only 12.1% of authors have published more than five papers in the leading marketing journals, the corresponding figures are 9.8% in the leading accounting journals (Chung, Pak, & Cox, 1992), 11.5% in the leading economics journals (Cox & Chung, 1991), and 8.5% in the leading finance journals (Chung & Cox, 1990).

As for the question of whether Lotka's Law provides a statistically consistent characterization of the bibliometric distribution patterns in the marketing literature, we find mixed evidence. The last row in Table 2 shows the theoretical frequency distribution of authorship as predicted by Lotka's Law (Cox & Chung, 1991). Comparison of the theoretical and actual frequency distributions of authorship for all 11 journals as a group (see the last two rows in Table 2) underscores the remarkable predictive power of Lotka's Law. In particular, it is impressive to note that the actual proportion of all authors with a single publication (59.2%) in our study is very close to that predicted (60.8%) by Lotka's Law. To statistically test whether Lotka's Law applies to the observed bibliometric distribution data, we perform the Chi-square goodness-of-fit test. The last column of Table 2 shows the results from the test. The results show that we cannot reject (at 1% significance level) the null hypothesis that Lotka's Law indeed describes the frequency distribution of the publications in the marketing literature as a whole across its 11 leading journals. However, when applied to individual journals, the results from the Chi-square goodness-of-fit test show that the null hypothesis of similarity between the actual publication frequency distribution pattern and that predicted by Lotka's Law is rejected at 1% significance level for each of the 11 journals.[9] Such results suggest that although overall authorship in an academic discipline is concentrated among its top scholars, the publication outputs of those individual scholars are typically spread across a number of leading disciplinary journals (Cox & Chung, 1991).

4.2. The generalized Lotka's Law: tests and findings

Based on the overall cumulative research output in each journal since its launch, we now apply the generalized Lotka's Law to further examine the nature of any empirical regularity in bibliometric distribution patterns of the leading marketing journals. As noted earlier, this is done through empirical estimation of Eq. (3) as a linear regression by forcing the intercept term to be zero[10] (Chung & Cox, 1990). We do the estimation for each of the journals individually as well as in groups of all, Tier 1 (IJRM, JM, JMR, MGS, JCR, and MS) and Tier 2 (JAMS, JR, JCP, ML, and QME) journals (Stremersch et al., 2007). As the regression results in Table 3 show, the exponent c is highly significant ($p<0.01$) and the adjusted R^2 values for the overall regression model fit are near perfect for each of the 11 journals individually and for each of the three journal groups. Specifically, the adjusted R^2 value in each case ranges between 0.98 and 0.99.

The regression results in Table 3 also show that the estimated values of the exponent c range from 2.05 to 2.83 across the 11 journals individually and in groups. This contrasts with a postulated value of 2.00 for the exponent c in the original Lotka's Law. Therefore, the high statistical significance of our estimated values of c along with the high adjusted R^2 values indicate that the general inverse power law type distributions (postulated in the generalized Lotka's Law) provide a statistically near perfect description of the observed bibliometric distribution patterns in each of the leading marketing journals. However, the specific inverse square law (postulated in the original

[6] For the journal type variable, we use *General Marketing* as the base focus and use dummies to capture the effects for the journals with other two types of focus.

[7] The complete algorithm for the sampling chain can be obtained from the authors upon request.

[8] We aggregate the data for $n \geq 10$ for succinctness. Detailed data for each journal for the case $n \geq 10$ are available from the authors upon request.

[9] This lower statistical fit between the actual publication frequency distribution pattern and that predicted by Lotka's Law for each of the individual journals compared to that for all of the leading disciplinary journals combined is similar to past findings from analogous studies in other areas such as finance, economics, and computer science (Cox & Chung, 1991).

[10] We also run regressions allowing for an intercept term and find the intercept term is not statistically different (at significance level of 1%) from zero in all cases.

Table 2
Bibliometric distribution patterns in the selected marketing journals: actual versus as predicted by Lotka's Law.

Journal	Number of papers published	Number of distinct authors	Publication frequency distribution in percent										Chi-square statistics for Lotka's Law
			1	2	3	4	5	6	7	8	9	≥10	
IJRM	657	958	77.0	13.8	4.7	1.5	0.9	0.6	0.6	0.2	0.1	0.5	109.11
JAMS	1238	1649	73.3	14.4	6.2	2.7	1.3	0.5	0.4	0.4	0.3	0.4	89.37
JCP	443	620	69.8	18.2	6.5	2.9	0.8	0.6	0.8	0.2	0.0	0.2	93.26
JCR	1432	1409	60.2	16.9	7.9	5.0	3.5	1.8	1.3	0.6	0.6	2.1	28.05
JM	2575	2547	69.9	16.4	6.3	2.8	1.4	1.1	0.7	0.4	0.4	0.6	69.13
JMR	1947	1921	62.8	16.3	8.3	4.1	3.2	1.4	1.1	0.5	0.6	1.7	32.88
JR	1974	1902	73.9	14.2	5.2	2.9	1.3	0.6	0.3	0.5	0.3	0.8	76.82
MGS[a]	692	934	76.0	13.4	4.6	2.4	1.5	0.9	0.3	0.4	0.2	0.3	112.04
ML	501	964	75.1	14.7	5.2	2.8	0.9	0.4	0.3	0.2	0.1	0.2	111.24
MKS	783	858	62.6	15.5	7.6	5.7	2.6	1.5	1.5	0.8	0.8	1.4	38.41
QME	99	180	80.6	13.3	5.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	147.38
All selected journals combined	12,341	8247	59.2	14.6	7.0	4.3	2.9	2.0	1.7	1.3	1.1	6.0	4.16
Lotka's Law	n.a.	n.a.	60.8	15.2	6.8	3.8	2.4	1.7	1.2	0.9	0.8	6.4	n.a.

[a] Data for *Management Science* consist of only those papers that focus on the marketing area.

Lotka's Law) is found to be a statistically more accurate description of the bibliometric distribution pattern only when all the leading journals are combined as a group.

Because the postulated value of the exponent c is equal to 2.00 in the original Lotka's Law, Table 3 shows that the authorship concentration levels in each of the individual 11 leading marketing journals are lower than what would be predicted by the original Lotka's Law. At the same time, it also shows that there are significant variations in such concentrations across the journals. In the last column in Table 3, we use the estimated values of the exponent c to order the 11 journals in terms of their relative levels of authorship concentration. We also estimate the exponent c for Tier 1 (JM, JMR, MGS, JCR, MS, and IJRM) versus Tier 2 (JAMS, JR, JCP, ML, and QME) journals and find its value to be closer to 2.00 for Tier 1 (2.07) versus Tier 2 (2.36) journals. This shows that the level of authorship concentration is relatively higher for Tier 1 journals as a group.

4.3. Comparison of authorship concentration with sister disciplines

From an inter-disciplinary perspective, an interesting question is whether the phenomenon of success-breeds-success in publication outcomes is markedly different in the leading marketing journals compared to that observed in the leading journals of sister disciplines within the business management area. To gain insights into this question, we first use a recent study by Mittal et al. (2008) to identify the leading journals in non-marketing areas within the broader business discipline. We then look through the literature to find studies that have systematically investigated the bibliometric distributions of any of the leading journals identified in step one. Table 4 summarizes the findings from such studies in terms of empirical estimates of the exponent c in the generalized Lotka's Law as applied to relevant bibliometric distributions. Because our estimates of the exponent c are based on identical data organization and analysis approach used in the other studies, the findings are comparable across all the studies. This shows that the levels of authorship concentrations — and thus the extent of the phenomenon of success-breeds-success in publication outcomes — in leading marketing journals is similar to those observed in leading journals in sister disciplines.

4.4. Authorship concentration: over time and across journals

So far, our authorship concentration estimates are based on the *overall* cumulative research outputs in respective journals since their launches. To gain insights into how such concentrations evolve over time, we now empirically analyze the cumulative research outputs over the 17 *incremental* time periods noted earlier. The empirically estimated values of the exponent c in the generalized Lotka's Law for the journals individually and as a group over the 17 time periods are given in Table 5 and graphically shown in Fig. 1. As evident from Table 5 and Fig. 1, the estimated value of the exponent c in the generalized Lotka's Law for the leading journals as a single group shows no systematic directional trend between 1925 and 1964 when there were only three leading journals. However, between 1965 and 2009, it shows a steady decline over time. In other words, as the scholarly research literature in the marketing discipline has grown since 1965, the authorship concentration level has steadily increased, which is consistent with the expected maturation characteristics of an academic discipline (Huber, 2002). Additionally, the current level is, in fact, remarkably close to what would be predicted by Lotka's Law for any mature academic discipline.

As Table 5 indicates, although the increasing trend in authorship concentration level over time also generally holds for the individual journals, there is variation in its relative speed and level. Using the dynamic linear model given by Eqs. (3) and (4), we next analyze how various journal characteristics explain such variation in authorship concentration level across journals and over time. The results of our analysis are given in Table 6. In reading the results, recall that a lower value of the exponent c indicates a higher level of authorship concentration. All dimensions of journal characteristics are found to have significant effects on authorship concentration level through one or more variables. As expected, journal maturity has a negative effect on

Table 3
Testing the generalized Lotka's Law of bibliometric distribution pattern for the selected marketing journals.

Journal	Exponent c of the generalized Lotka's Law			Overall fit (adj. R^2)	Journal rank by authorship concentration based on estimate of c
	Estimate	Std. err.	t-value		
IJRM	2.63	0.05	48.02	0.99	9
JAMS	2.63	0.04	66.89	0.99	8
JCP	2.58	0.09	28.56	0.99	7
JCR	2.17	0.05	39.90	0.99	2
JM	2.53	0.04	63.35	0.99	5
JMR	2.26	0.04	57.06	0.99	3
JR	2.35	0.08	28.65	0.98	4
MGS [a]	2.54	0.04	69.48	0.99	6
ML	2.74	0.06	43.07	0.99	10
MKS	2.15	0.06	33.62	0.99	1
QME	2.83	0.10	27.34	0.99	11
Tier 1 journals combined [b]	2.07	0.02	91.25	0.99	n.a.
Tier 2 journals combined [b]	2.36	0.05	51.11	0.99	n.a.
All selected journals combined	2.05	0.02	83.21	0.99	n.a.

[a] Data for *Management Science* consist of only those papers that focus on marketing.
[b] Tier 1 journals consist of IJRM, JM, JMR, MGS, JCR, and MS; Tier 2 journals consist of JAMS, JR, JCP, ML, and QME (Stremersch et al., 2007).

Table 4
Comparison of authorship concentrations across leading journals in selected areas within the business management discipline.

Journals	Empirical estimate of the exponent c in the generalized Lotka's Law	Source
Marketing	2.05	This study
International Journal of Research in Marketing	2.63	
Journal of the Academy of Marketing Science	2.63	
Journal of Consumer Psychology	2.58	
Journal of Consumer Research	2.17	
Journal of Marketing	2.53	
Journal of Marketing Research	2.26	
Journal of Retailing	2.35	
Management Science[a]	2.54	
Marketing Letters	2.74	
Marketing Science	2.15	
Quantitative Marketing & Economics	2.83	
Accounting	1.92	Chung, Pak & Cox (1992)
Accounting, Organizations and Society	2.25	
Contemporary Accounting Research	2.94	
Journal of Accounting and Economics	2.45	
Journal of Accounting Research	2.39	
The Accounting Review	2.45	
Economics	1.84	Cox and Chung (1991)
Econometrica	2.35	
International Economic Review	2.86	
Journal of Political Economy	2.66	
Quarterly Journal of Economics	3.11	
Review of Economics and Statistics	2.95	
Review of Economic Studies	2.58	
The American Economic Review	2.31	
The Rand Journal of Economics[b]	2.74	
Finance	≈2.00	Chung and Cox (1990)
Journal of Finance	2.10	
Journal of Financial Economics	1.95	
Journal of Financial and Quantitative Analysis	2.26	

[a] Data for *Management Science* consist of only those papers that focus on marketing.
[b] Formerly known as *Bell Journal of Economics*.

the exponent c. We find that the level of authorship concentration is higher for journals with *Consumer Behavior* focus than for those with focus on *General Marketing* or *Quantitative Marketing Methods and Science*.

In terms of the effect of journal attractiveness, we find that authorship concentration increases when a journal offers an award. This is likely because more prolific researchers would target the journal hoping to win the award, thereby engendering a more skewed bibliometric distribution pattern (Hodgson & Rothman, 1999). We also find that authorship concentration decreases when the number of competing journals increases in any given time period. This finding implies that when a new competing journal enters the "publication market", it lowers the "entry barrier" for new and lesser-published authors in all competing journals. That would be consistent with the situation when the entry of a new journal creates competitive pressure on all other disciplinary journals to strive for more diversified topical articles from expanded author bases and induces authors to consider greater diversification for their publication outlets.

Interestingly, we find that the parameter for Tier 1 is insignificant. This appears to be at odds with the earlier results in Table 3, showing that the value of c for Tier 1 journals is significantly lower than that of Tier 2 journals. However, it is important to recall that the findings in Table 3 are based on combined research outputs of all journals of the same tier over the entire time period, whereas those in Table 6 are based on research outputs of each journal separately over every cumulative five-year period intervals. Taken together, the findings thus suggest that authorship concentration levels — after controlling for other factors — are similar between *individual* Tier1 and Tier 2 journals. At the same time, successful authors in one Tier 1 (Tier 2) journal are more (less) likely to exhibit subsequent publication successes across Tier 1 (Tier 2) journals as a group. This outcome is most likely a reflection of the self-selection process of long-term journal targeting by authors based on journal reputations.

In terms of the effect of review process, we find that the presence of multiple editors decreases authorship concentration. This finding suggests that a journal's author base becomes broader when it has more than one editor. However, we find that presence of AEs increases authorship concentration. A possible explanation is that a journal becomes narrower in scope when an AE system is present. This could be because journals become increasingly focused toward the AEs' expertise. This effect is different from that of multiple editors because of the difference in roles between editors and AEs. Whereas an AE serves as the gatekeeper for the topical area in which he/she is an expert, an editor ensures that a paper meets the general requirements to be published in a journal irrespective of his/her own topical area of expertise (Lawrence, 2003).

As for the extent of author collaborations, we find that having more authors per paper increases authorship concentration. This implies that a higher collaboration level does not typically increase the author base of a journal, as it comes from the journal's existing pool of authors. Finally, we find that the autoregressive evolution parameter is negative and significant, which means that there are significant carryover effects in concentration levels across time periods. However, it is small with an absolute value significantly less than one, implying that any shock will dissipate over time and the exponent c will quickly revert toward its mean.

5. Concluding discussions

5.1. Summary of the main findings

In this study, we use a comprehensive data set from 11 leading marketing journals to examine if there is any empirical regularity in the patterns of research productivity in the marketing literature. We find strong evidence that there is indeed a distinct empirical regularity. It is the generalized Lotka's Law of scientific productivity pattern: the number of authors publishing n papers is approximately $1/n^c$ of those publishing one paper. We find the empirically estimated value of the exponent c to be 2.05 for the overall bibliometric data across the leading marketing journals, which closely conforms to the value postulated by the original Lotka's Law of 1926. For the individual journals, the estimated values of c range from 2.15 to 2.83, with lower values indicating higher authorship concentration levels. We also find evidence that, across all journals, authorship concentration levels have steadily increased since 1965. At the same time, the levels of authorship concentrations in the leading marketing journals are found to be quite comparable to those observed in the leading journals of related business management disciplines such as accounting, economics, and finance. We find that the variations in authorship concentration levels across leading marketing journals and over time are driven by a journal's maturity, its topical focus, its relative attractiveness as a publication outlet, the characteristics of its review process, and the extent of author collaborations found in it.

5.2. Implications

Our findings underscore the remarkable applicability of the generalized Lotka's Law of scientific productivity, which has been found to hold not only in various natural science disciplines but also in various social science disciplines (Chung et al., 1992; Cox & Chung, 1991), which now include the marketing discipline. In the process, our study contributes to the broader research stream that seeks to identify empirical regularities in observed distribution patterns across disparate contexts in social and natural science areas (Andriani & McKelvey, 2009). In addition to its relevance to the wider academic community in uncovering empirical regularity in research

Table 5
Values of the exponent *c* from estimating the generalized Lotka's Law for each journal and for each time window.

Journal	Incremental time windows																
	1925–1929	1925–1934	1925–1939	1925–1944	1925–1949	1925–1954	1925–1959	1925–1964	1925–1969	1925–1974	1925–1979	1925–1984	1925–1989	1925–1994	1925–1999	1925–2004	1925–2009
JR	2.82	2.21	2.03	1.80	1.91	2.14	2.16	2.17	2.11	2.15	2.24	2.26	2.31	2.34	2.36	2.35	2.35
JM	–[a]	–[a]	2.59	2.94	2.67	2.53	2.765	2.85	2.69	2.75	2.68	2.62	2.65	2.60	2.53	2.51	2.53
MGS[c]	–[a]	–[a]	–[a]	–[a]	–[a]	–[b]	–[b]	3.57	2.83	2.85	2.75	2.72	2.68	2.68	2.63	2.62	2.54
JMR	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[b]	2.48	2.48	2.45	2.41	2.37	2.30	2.27	2.20	2.26
JAMS	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	4.19	2.82	2.71	2.82	2.73	2.65	2.66	2.63
JCR	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	2.66	2.59	2.57	2.31	2.21	2.24	2.17
MKS	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	3.07	2.39	2.31	2.13	2.07	2.15
IJRM	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[b]	3.13	2.60	2.77	2.68	2.63
ML	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[b]	3.04	2.59	2.63	2.74
JCP	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[b]	2.72	2.87	2.58
QME	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	–[a]	3.05	2.83
All selected journals combined	2.82	2.21	2.13	2.19	2.37	2.29	2.40	2.41	2.40	2.38	2.30	2.24	2.20	2.18	2.15	2.10	2.05

[a] The respective journal was not in publication over this time period.
[b] The respective journal was in publication over this time period, but variation in publication count data across authors over this time period is not enough to estimate the generalized Lotka's Law.
[c] Data for *Management Science* consist of only those papers that focus on marketing.

productivity patterns across diverse academic disciplines, our study is especially relevant for marketing academics in understanding several important aspects of their "intellectual marketplace". For one, our findings in Table 2 on the publication frequency distributions are useful in assessing the relative standing of an individual researcher in the marketing discipline in terms of research productivity in its 11 leading disciplinary journals. For example, Table 2 indicates that a researcher who has authored seven or more publications in those leading marketing journals belongs to the 90th percentile among all researchers who have *ever* published in these journals. Such an assessment of relative research productivity is naturally of great interest and value to individual researchers and academic administrators in any discipline for evaluating the career progress, salary level, and tenure prospects of faculty members (Diamantopoulos, 1996; Mittal et al., 2008; Seggie & Griffith, 2009).

Also, our findings shed interesting insights for authors and journal editors when it comes to understanding the extent of the success-breeds-success phenomenon and the resulting level of "entry barriers" to publications in the marketing discipline. For instance, all else being the same, the authorship concentration levels in Table 3 give a relative and current sense of the expected degree of difficulty of "breaking in" as a first-time author in each of the 11 leading marketing journals. Conversely, they also provide a sense of the relative extent of the success-breeds-success phenomenon that an already published author may expect for repeat publication chances across these journals. In addition, our findings on the drivers of authorship concentration levels are of practical importance to marketing scholars, especially doctoral students. For example, if a leading journal changes from a review system of having a single editor to multiple editors, better publication opportunities are likely for prospective first-time authors. Similarly, if a new, potentially leading journal is launched, a marketing scholar is likely to have a better chance during such time windows of publishing in an existing leading journal for the first time. On the other hand, an already published marketing scholar will enjoy a relatively better chance of *repeat* publications in journals that are older, have AEs as part of review systems, or focus primarily on consumer behavior. Also, as one would expect, collaborations among already published marketing scholars accentuate the level of the success-breeds-success phenomenon enjoyed by these scholars.

In the context of our findings, it is important to note that the phenomenon of success-breeds-success (reflecting combined effects of sacred spark and cumulative advantage concepts) is not unexpected when it comes to research publications in leading disciplinary journals. Rather, it reflects the reality that the most prolific

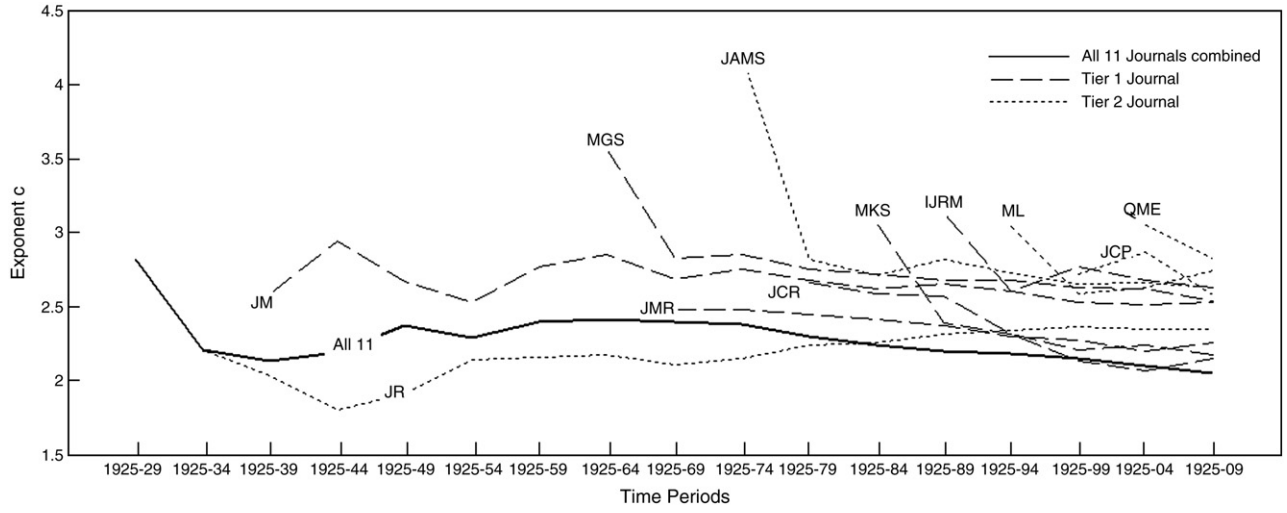

Fig. 1. Plot of exponent *c* over time periods and across journals.

Table 6
Results of the hierarchical model of the generalized Lotka's Law with pooled data of the selected marketing journals across multiple time periods.

Dimension	Variable	Parameter
Maturity	*Age* (time since introduction in 100 years) (β_1)	−0.652[a]
Focus	*GM* (General Marketing — JM, JR) (base type)	0.000
	QMMS (Quantitative Marketing Methods and Science — JMR, MKS, MGS, JAMS, IJRM, ML, QME) (β_2)	0.060
	CB (Consumer Behavior — JCR, JCP) (β_3)	−0.277[a]
Attractiveness	*Tier1* (JM, MGS, MKS, JCR, JMR, IJRM) (β_4)	0.103
	Articles (average articles per year) (β_5)	−0.002
	Award (proportion of years with award) (β_6)	−0.233[a]
	SSCI (proportion of years indexed in SSCI) (β_7)	0.024
	CJ (number of competing journals available) (β_8)	0.072[a]
Review characteristics	*Editors* (proportion of years with >1 editor) (β_9)	0.448[a]
	AE (proportion of years with AE) (β_{10})	−0.239[a]
Extent of collaboration	*Authors* (average authors per paper) (β_{11})	−0.264[a]
	Evolution Parameter (λ)	−0.106[ab]
	Intercept (β_0)	2.782[a]

[a] Indicates that 95% posterior confidence interval does not include zero.
[b] Indicates that 95% posterior confidence interval does not include −1.

researchers in a discipline in terms of publication productivity level are also the ones who concentrate their publication efforts on the top-tier publication outlets within the discipline (Swanson et al., 2007). Consequently, a higher level of authorship concentration in publication outputs in any leading disciplinary journal is not necessarily a cause for concern in itself for its editorial board. At the same time, it is important that the editorial boards of leading disciplinary journals have periodic insights from systematic studies like this one about how such authorship concentration levels in respective leading journals compare across sister disciplines. If such a comparison of authorship concentration levels across disciplines shows a markedly higher concentration level in a specific discipline, this might indicate some systemic problem in the underlying knowledge-creation process within this discipline and might help to trigger healthy periodic reviews of such a process (Hodgson & Rothman, 1999; Laband & Piette, 1994). To that extent, the following two observations are in order based on our findings.

First, when it comes to publications in the leading marketing journals, our study shows that the level of the success-breeds-success phenomenon experienced by established marketing scholars and thus the level of "entry barriers" experienced by junior marketing scholars are quite comparable to those of their peers in sister business disciplines. On the other hand, from an intra-disciplinary perspective, our findings also provide systematic evidence of a relatively higher level of authorship concentration and thus provide evidence of "entry barriers" in the leading marketing journals with a consumer behavior focus. This evidence appears to be consistent with recently expressed views by some marketing scholars about the "growing balkanization of academic marketing" that is driven by "narrowly specified, fragmented research produced by 'solo scholars' or small teams" (Reibstein, Day, & Wind, 2009). These scholars argue that such "balkanization" is detrimental to effectively address the multi-faceted and interconnected problems faced by marketing managers in reality. As such, we believe that our study sheds some interesting insights relevant to the emerging and introspective discussions about the current state and future directions of research in marketing academia.

5.3. Future research directions

Given the focus of our current study, two complementary directions for future research are worth noting. We primarily use a positivistic approach to investigate the relative levels of authorship concentration in leading marketing journals and their evolving trends. Therefore, an interesting future research direction would be to focus more on the normative aspects of authorship concentration trends. Specifically, it would entail examining the consequences of the observed trend of increased authorship concentration level in marketing academia. For example, has it lead to an increased topical concentration level in the leading journals? What has been its concomitant effect on citation impact levels of journals?

Additionally, the focus of our study here is on the nature of aggregate patterns of research productivity across authors in the marketing discipline. Therefore, a second interesting future research direction would be to investigate the key drivers of productivity levels of individual marketing scholars. Past studies of such productivity drivers in the marketing discipline have used path-independent, static empirical models to analyze the total research publications of individual scholars (e.g., Diamantopoulos, 1996). In contrast, a relevant future study would be to use path-dependent, dynamic empirical models used in several other disciplines for analyzing longitudinal data of publications by individual scholars (Allison & Stewart, 1974; DiPrete & Eirich, 2006). Unlike past studies in the marketing discipline, such a modeling approach will enable future research to estimate the separate roles of the sacred spark and cumulative advantage concepts in driving publication outputs of marketing scholars. Although it will involve challenging data collection efforts such as merging attitudinal survey data with publication data of individual scholars, such a research study will provide another important missing element to the recent stream of research focusing on researchers and research outcomes in the marketing discipline (Seggie & Griffith, 2009; Stremersch et al., 2007; Stremersch & Verhoef, 2005).

Acknowledgments

The authors are grateful for the comments of Eric Bradlow on an earlier version of this article. They would also like to thank the IJRM review team — editor Marnik Dekimpe, associate editor Peter Verhoef, and two anonymous reviewers — for their valuable suggestions. The authors acknowledge the financial support from the Erasmus Research Institute of Management (ERIM).

References

Akerlof, G. A. (1970). The market for "lemons": Quality uncertainty and the market mechanism. *Quarterly Journal of Economics*, *84*(3), 488–500.
Allison, P. D., & Stewart, J. A. (1974). Productivity differences among scientists: Evidence for accumulative advantage. *American Sociological Review*, *39*, 596–606.
Andriani, P., & McKelvey, B. (2009). From Gaussian to Paretian thinking: Causes and implications of power laws in organizations. *Organization Science*, *20*, 1053–1071.
Carter, C. K., & Kohn, R. (1994). On Gibbs sampling for state space models. *Biometrika*, *81*(3), 541–553.
Chung, K. H., & Cox, R. A. K. (1990). Patterns of productivity in the finance literature: A study of the bibliometric distributions. *Journal of Finance*, *45*(Mar), 301–309.
Chung, K. H., Pak, H. S., & Cox, R. A. K. (1992). Patterns of research output in the accounting literature: A study of the bibliometric distributions. *Abacus*, *28*(2), 168–185.
Coile, R. (1977). Lotka's frequency distribution of scientific productivity. *Journal of the American Society for Information Science*, *28*(6), 366–370.
Cole, J. R., & Cole, S. (1973). *Social stratification in science*. Chicago: University of Chicago Press.
Cox, R. A. K., & Chung, K. H. (1991). Patterns of research output and author concentrations in the economics literature. *The Review of Economics and Statistics*, *73*, 729–733.
Diamantopoulos, A. (1996). A model of the publication performance of marketing academics. *International Journal of Research in Marketing*, *13*, 163–180.
DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology*, *32*, 271–297.
Eaton, J. P., Ward, J. C., Kumar, A., & Reingen, P. H. (1999). Structural analysis of co-author relationships and author productivity in selected outlets for consumer behavior research. *Journal of Consumer Psychology*, *8*(1), 39–59.
Feller, W. (1968). *An introduction to probability theory and its applications*. New York: John Wiley and Sons.
Gans, J. S., & Shepherd, G. B. (1994). How are the mighty fallen: Rejected classic articles by leading economists. *Journal of Economic Perspectives*, *8*, 165–179.
Grove, W., & Wu, S. (2007). The search for economics talent: Doctoral completion and research productivity. *The American Economic Review*, *97*, 506–511.

Hodgson, G. M., & Rothman, H. (1999). The editors and authors of economics journals: A case of institutional oligopoly. *The Economic Journal*, *109*, 165–186.
Hoffman, D. L., & Holbrook, M. B. (1993). The intellectual structure of consumer research: A bibliometric study of author cocitations in the first 15 years of the Journal of Consumer Research. *Journal of Consumer Research*, *19*(Mar), 505–517.
Huber, J. (2002). A new model that generates Lotka's Law. *Journal of the American Society for Information Science and Technology*, *53*(3), 209.
Koenig, M., & Harrell, T. (1995). Lotka's Law, Price's urn, and electronic publishing. *Journal of the American Society for Information Science*, *46*(5), 386–388.
Laband, D., & Piette, M. (1994). Favouritism versus search for good papers: Empirical evidence regarding the behaviour of journal editors. *Journal of Political Economy*, *102*, 194–203.
Lawrence, P. A. (2003). The politics of publication. *Nature*, *422*(Mar), 259–261.
Lehmann, D. (2005). Journal evolution and the development of marketing. *Journal of Public Policy and Marketing*, *24*(1), 137–142.
Lotka, A. J. (1926). The frequency distribution of scientific productivity. *Journal of the Washington Academy of Sciences*, *16*, 317–323.
Merton, R. K. (1973). The Matthew effect in science. In N. W. Storer (Ed.), *The sociology of science*. Chicago: University of Chicago Press.
Michaels, J. W., & Pippert, J. M. (1986). Social science journal characteristics and journal citation measures. *The Social Science Journal*, 33–42.
Mittal, V., Feick, L., & Murshed, F. (2008). Publish and prosper: The financial impact of publishing by marketing faculty. *Marketing Science*, *27*(3), 430–442.
Newman, M. E. J. (2001). The structure of scientific collaboration networks. *Proceedings of the National Academy of Sciences of the United States of America*, *98*(2), 404–409.
Price, D. S. (1976). A general theory of bibliometric and other cumulative advantage processes. *Journal of the American Society for Information Science*, *27*, 292–306.
Reibstein, D. J., Day, G., & Wind, J. (2009). Guest editorial: Is marketing academia losing its way? *Journal of Marketing*, *73*(July), 1–3.
Rodgers, R., & Rodgers, N. (1999). The sacred spark of academic research. *Journal of Public Administration Research and Theory*, *9*(3), 473–492.
Seggie, S. H., & Griffith, D. A. (2009). What does it take to get promoted in marketing academia? Understanding exceptional publication productivity in the leading marketing journals. *Journal of Marketing*, *73*(Jan), 122–132.
Stremersch, S., & Verhoef, P. C. (2005). Globalization of authorship in the marketing discipline: Does it help or hinder the field? *Marketing Science*, *24*(4), 585–594.
Stremersch, S., Verniers, I., & Verhoef, P. C. (2007). The quest for citations: Drivers of article impact. *Journal of Marketing*, *71*(July), 171–193.
Swanson, E. P., Wolfe, C. J., & Zardkoohi, A. (2007). Concentration in publishing at top-tier business journals: Evidence and potential explanations. *Contemporary Accounting Research*, *24*, 1255–1289.
Talukdar, D. (2011). Patterns of research productivity in the business ethics literature: Insights from analyses of bibliometric distributions. *Journal of Business Ethics*, *98*(1), 137–151.
West, M., & Harrison, J. (1997). *Bayesian forecasting and dynamic models* (2nd ed.). New York: Springer-Verlag.