Journal of Business Ethics (2011) 98:137–151
DOI 10.1007/s10551-010-0539-5

Patterns of Research Productivity in the Business Ethics Literature: Insights from Analyses of Bibliometric Distributions

Debabrata Talukdar

ABSTRACT. In any academic discipline, published articles in respective journals represent ''production units'' of scientific knowledge, and bibliometric distributions reflect the patterns in such outputs across authors or ''producers.'' Closely following the analysis approach used for similar studies in the economics and finance literature, we present the first study to examine whether there exists an empirical regularity in the bibliometric patterns of research productivity in the business ethics literature. Our results present strong evidence that there indeed exists a distinct empirical regularity. It is the so-called Generalized Lotka's Law of scientific productivity pattern: the number of authors publishing n papers is about $1/n^c$ of those publishing one paper. We discuss the likely processes that underlie the productivity pattern postulated by the Generalized Lotka's Law. We find that the value of the exponent c is equal to about 2.6 for the comprehensive bibliometric data across the two leading business ethics journals. The observed research productivity pattern in the business ethics area, a relatively young discipline, is interestingly very consistent with those found in much older, related business disciplines like economics, accounting, and finance. We discuss the general implications of our findings.

KEY WORDS: bibliometric distributions, business ethics, cumulative advantage, empirical regularity, knowledge creation, Lotka's Law, research productivity patterns

Introduction

Every year thousands of peer-reviewed research articles are published in journals across various academic disciplines. For any academic discipline, the published articles in its respective journals represent ''production units'' of scientific knowledge, and their bibliometric distributions reflect the patterns in such scientific productivity across authors or ''producers'' (Coile, 1977; Solla, 1976). This process of scientific knowledge generation and accumulation raises several interesting research questions. For instance, is there an empirical regularity in scientific productivity patterns as captured in bibliometric distributions across authors? If so, how universal is such regularity across disciplines? What does it imply about the extent of ''success breeds success'' phenomenon in the context of publication outcomes by authors in an academic discipline and in its leading research journals?

The aforesaid questions seek insights that are not only of considerable general interest, but also of particular import to researchers in various academic disciplines in understanding the patterns of scientific productivity and their implications. Not surprisingly, there exists a rich stream of research that has examined the role of journals as means of scientific outputs in academic disciplines and the patterns in such outputs as captured through bibliometric distributions across authors (e.g., Bino et al., 2005; DiPrete and Eirich, 2006; Huber, 2002; Lovell, 1973; Morris and Goldstein, 2007; Price, 1976; Stigler et al., 1995). Arguably, the most influential and well-known study on the patterns of bibliometric distributions is the seminal paper by Lotka (1926).

In his aforesaid paper, Lotka investigated the frequency distribution of publication productivity of chemists and physicists. After analyzing a number of publication contributions by chemists listed in *Chemical Abstracts* and of physicists listed in Auerbach's *Geschichtstafeln der Physik*, he observed that the number of authors making n publication contributions is about $1/n^2$ of those making one, and

the proportion of all contributors that make a single contribution is about 60%. Since its publication, his empirical findings have become established as the Lotka's Law of scientific productivity which is summarized by the equation:

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

where a_n the number of authors publishing n papers, a_1 the number of authors publishing one paper.

Following the publication of the above paper by Lotka, many studies have investigated the degree of conformity of Lotka's Law with the empirical reality in the patterns of research productivity across authors in different academic disciplines and in respective leading disciplinary journals. The academic disciplines studied include finance, accounting, economics, computer science, information science, library science, medical science, and humanities. Table I shows a selected list of such studies and their main findings. Unfortunately, a search of this stream of literature reveals the conspicuous absence of an analogous study in the business ethics academic discipline. However, the business ethics discipline represents a relatively young and high growth research stream within the overall social science academic area (Kahn, 1990; Wry, 2009). Therefore, a particularly interesting question is whether the research output patterns in this relatively young discipline show evidence of the same type of empirical regularity as has been postulated by Lotka's Law and has been observed in more mature disciplines, including related business disciplines like economics and finance. In the above question lies the motivation of our study.

The goal of our study is to undertake the first systematic analysis of empirical regularities in the pattern of research outputs in the academic discipline of business ethics. Our study covers both the leading journals in the business ethics discipline, viz., *Business Ethics Quarterly* and *Journal of Business Ethics*. We use a comprehensive data set that includes all research

TABLE I

Empirical testing of Lotka's Law of scientific productivity: selected studies across various academic disciplines

Study	Academic area	Main finding on statistically estimated authorship concentration pattern versus that predicted by Lotka's Law
Bino et al. (2005)	Economics[a]	Estimated concentration pattern relatively more diffused than predicted
Chung and Cox (1990)	Finance	Estimated and predicted patterns very close
Chung et al. (1992)	Accounting	Estimated and predicted patterns very close
Chung and Puelz (1992)	Risk Management	Estimated and predicted patterns very close
Cox and Chung (1991)	Economics	Estimated and predicted patterns very close
Gupta et al. (1998)	Physics[b]	Estimated and predicted patterns very close
Murphy (1973)	Humanities	Estimated and predicted patterns very close
Radhakrishnan and Kernizan (1979)	Computer Science	Estimated concentration pattern relatively more diffused than predicted
Schorr (1975)	Map librarianship	Estimated and predicted patterns very close
Schorr (1974)	Library Science	Estimated concentration pattern relatively more diffused than predicted
Subramanyam (1979)	Computer Science	Estimated and predicted patterns very close
Voos (1974)	Information Science	Estimated concentration pattern relatively more diffused than predicted
Worthen (1978)	Medicine	Estimated concentration pattern relatively more diffused than predicted

[a]Studies only economics journals based in India.
[b]Studies only physics journals based in India.

publications in these two journals since their respective launch years to a very recent date (November 30, 2009). Our study provides the "missing counterpart" to similar studies in many other disciplines including sister business disciplines like economics, finance, and accounting (Chung and Cox, 1990; Chung et al., 1992; Cox and Chung, 1991).

In order to adequately address the substantive research questions as well as to allow meaningful comparison of our findings, the empirical methodology adopted in our study follows identical approach used in analogous studies across other disciplines. Specifically, we investigate the following inter-related interesting questions: How does Lotka's Law fits with the bibliometric distribution patterns for the leading journals in the business ethics area? Is there an empirical regularity in such distribution patterns? How do the leading business ethics journals compare to each other in terms of such regularity? How do they compare to the leading journals in other business management disciplines like the finance and economics? By addressing the aforesaid questions, our study contributes to the literature in several important ways.

For one, the insights from our study is important to the wider academic community in understanding the nature of research output patterns and any empirical regularity embedded in such patterns across diverse academic disciplines. Scientific analyses and identifications of empirical regularities across diverse contexts in social and natural environments constitute a vital element of research goals in social and natural sciences (Bettencourt et al., 2007; Gabaix, 1999). Through investigation for the existence of empirical regularities in research output patterns in a relatively young but increasingly important social science area (Kahn, 1990; Waples et al., 2009; Wry, 2009), our study thus also contributes to this broader scientific research objective of systematic documentation of empirical regularities (Andriani and McKelvey, 2009). If our study can find evidence that the patterns in research outputs generated by thousands of individual researchers in a relatively young academic discipline exhibit the same type of empirical regularity as found in much older disciplines, then it will point to a remarkable consistency in the underlying scientific knowledge creation process across diverse academic disciplines. It will also provide additional evidence in support of the maturation of the business ethics discipline.

Further, the answers to our research questions are of direct relevance to academics in the business ethics area in understanding the nature of "market concentrations" in their "intellectual marketplace." They shed insights into the degree of authorship concentration in the leading journals in this academic area, and how it compares to those of the leading journals in more mature business disciplines like economics, accounting, and finance. Comparison of authorship concentrations is particularly useful in a relatively young academic discipline like business ethics where most of its leading research journals were introduced only since the 1980s. For instance, evidence of relatively higher authorship concentrations across its leading journals in any discipline may reflect undesirable levels of "entry barriers" to scholarly publications, and thus problems in the underlying knowledge creation process (Swanson et al., 2007). That can stimulate legitimate discussion within the discipline about its doctoral student trainings, journals' editorial board compositions and peer review processes[1] (Grove and Wu, 2007; Hodgson and Rothman, 1999; Holbrook, 1986; Laband and Piette, 1994).

Our study is especially relevant to researchers in the context of the so-called "publish or perish" and "publish and prosper" realities when it comes to publications in leading disciplinary journals (Mittal et al., 2008; Zivney and Bertin, 1992). The findings from our study stand to shed systematic insights into the relative degree to which "success breeds success" when it comes to publication in the leading business ethics journals. Also, our study's focus into the nature of *aggregate patterns* in research productivity across publishing authors in the business ethics discipline nicely complements recent studies in the discipline that have investigated the *disaggregate levels* of productivity among individual researchers (Sabrine, 2002) or the *collaborative structure* among individual researchers (Tseng et al., 2010). It also complements past studies that investigate the intellectual nature and merit of research in the business ethics discipline (Dean, 1997; Robertson, 2008).

The rest of the paper is organized as follows. While the next section presents a conceptual framework for our study, "Methods" section discusses the data and methodologies used for our empirical analyses. We present our empirical findings in "Empirical analysis results" section and conclude in "Concluding discussions" section.

Conceptual framework

Theories behind bibliometric distributions: a brief literature review

A commonly observed phenomenon in academic and artistic fields is highly skewed distributions of professional outputs among individuals working in such areas (Chung and Cox, 1990). Specifically, a distinctive pattern in such areas is that a significant share of respective professional outputs is contributed by a relatively small number of individuals. This phenomenon has since come to represent the so called notion of ''success breeds success'' (Cox and Chung, 1991). Systematic studies of this phenomenon in academic areas have focused on analyzing the patterns of bibliometric distributions to estimate the degrees of authorship concentration in respective leading journals. As for the analysis approach used in this empirical research stream, many of the past studies (refer to Table I) as well as this current study essentially use the ''positive economics'' methodology (Friedman, 1966). The goal is to gain insights into ''what is'' the empirical reality in terms of how skewed are the patterns of bibliometric distributions in different academic areas. However, several studies have also proposed theories as to what we can expect in terms of patterns for such skewed bibliometric distributions, and why. These proposed 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 for the skewed bibliometric distributions, two concepts exist in the literature – ''sacred spark'' and ''cumulative advantage.'' The sacred spark concept holds that there are inherent differences among researchers in any academic discipline in terms of their motivation and effort to carry out research. Some researchers ''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 and 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.

With respect to the concept of cumulative advantage, it 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 attracts new resources as well as rewards that facilitate continued high performance (DiPrete and Eirich, 2006). Over time, such early success by a researcher leads to more success through accumulated experiences and learning from successfully negotiating the academic publication process. Allison and Stewart (1974) hypothesize that the cumulative advantage and the sacred spark processes combine together to produce an increasingly skewed research output distribution over time in favor of a small number of highly successful researchers in any given academic discipline. They test the combination hypothesis and find that the two processes contribute equally to the observed disparity in productivity across researchers over their careers.

As Chung and Cox (1990) note in their study of bibliometric distribution patterns in the finance discipline, several mathematical and statistical theory-based studies have also attempted to model how such distribution patterns can occur in the first place and the best analytical ways to characterize them. For instance, while Mandelbrot (1954) and Bookstein (1977) propose deterministic, mathematical theorizations of the bibliometric distributions, Simon (1955) and Price (1976) propose stochastic theorizations of such distributions. Specifically, using a model of word storage in the human mind and information theoretic considerations, Mandelbrot (1954) posits that the number of publications of the rth ranking author, $f(r)$, is proportional to $1/(1 + /\beta r)\tau$, where β and τ are constants. In contrast, using a different motivational rationale, Bookstein (1977) posits that the number of authors publishing n papers is proportional to $1/n^c$ where c is a constant. As Bookstein (1977) shows, it is relevant to point out that for $\tau = 1$ or $c = 2$, the aforesaid forms of bibliometric distributions postulated by Mandelbrot and Bookstein are

simplified to the form given by the earlier discussed Lotka's Law.

As for stochastic theorizations of bibliometric distributions, Simon (1955) develops a model which implies that the number of authors with n publications is proportional to $1/[n(n+1)(n+2)\cdots(n+k-1)]$ for some integer k or, more generally, to $\Gamma(n)/\Gamma(n+c)$, where c is a constant. Again, it is relevant to point out that, if n is much larger than c, $\Gamma(n)/\Gamma(n+c) \approx 1/n^c$, which is the same result as that postulated by Bookstein (1977) and is the generalized version of the Lotka's Law (Cox and Chung, 1991). In perhaps a better 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 concept of cumulative advantage as an underlying explanation for the skewed bibliometric distributions in academic disciplines. The Polya Urn model supposes that fate has in storage an urn containing red and black balls with a ball being drawn at random at regular intervals (Chung and Cox, 1990; Feller, 1968). At each drawing the number of balls of the specific color drawn is increased while 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; i.e., 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 cumulative advantage concept differs from the Polya Urn model in that success 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 model bibliometric distributions consistent with cumulative advantage or "success breeds success" concept. Price shows that such a stochastic model is governed by the beta function, which can be approximated by a skewed or hyperbolic distribution of the type that is widespread in bibliometric distributions and diverse social science phenomena. In particular, the model is shown to be an appropriate underlying probability theory for the Lotka's Law of scientific productivity (Huber, 1998; Koenig and Harrell, 1995). There continues to be more recent studies that use various other types of stochastic modeling theories to generate and explain the specific skewed pattern of research productivity postulated by Lotka's Law (e.g., see Huber, 2002).

Lotka's Law: original postulation and subsequent generalization

As noted before, Lotka's Law has emerged as the most influential and well-known characterization – based on both theoretical and empirical supports – of the skewed patterns in bibliometric distributions of scientific research outputs (Chung and Cox, 1990; Huber, 2002). It is thus instructive to derive the theoretical frequency distribution of authorship as predicted by the original Lotka's Law shown in Eq. 1 earlier. For such derivation, we first note that

$$\sum_{i=1}^{\infty} a_i = a_1\left(\sum_{i=1}^{\infty}\frac{1}{i^2}\right) \tag{2}$$

However, it can be shown that (Cox and Chung, 1991)

$$\sum_{i=1}^{\infty}\frac{1}{i^2} = \frac{\pi^2}{6} \tag{3}$$

Therefore, the proportion of all authors publishing a single paper can be derived as

$$a_1/a_1\left(\sum_{i=1}^{\infty}\frac{1}{i^2}\right) = \frac{6}{\pi^2} = 0.608 \tag{4}$$

Similarly, the proportions of authors publishing two, three, and n papers can be derived as

$$a_2/a_1\left(\sum_{i=1}^{\infty}\frac{1}{i^2}\right) = \frac{6}{\pi^2}\frac{1}{2^2} = 0.152 \tag{5}$$

$$a_3/a_1\left(\sum_{i=1}^{\infty}\frac{1}{i^2}\right) = \frac{6}{\pi^2}\frac{1}{3^2} = 0.067 \tag{6}$$

and

$$a_n/a_1\left(\sum_{i=1}^{\infty}\frac{1}{i^2}\right) = \frac{6}{\pi^2}\frac{1}{n^2} \tag{7}$$

Since its publication in 1926, other researchers investigating patterns of bibliometric distributions of scientific research outputs have broadened the

scope of the original Loka's Law in Eq. 1 by proposing the following generalized version (Chung and Cox, 1990):

$$a_n = a_1/n^c, \quad n = 1, 2, 3, \ldots \tag{8}$$

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 a comparison of Eq. 1 with Eq. 8 shows, the Generalized Lotka's Law represents an inverse power law with exponent c, while the original Lotka's Law is a specific form of the inverse power law, viz., the inverse *square* law with value of the exponent $c = 2$. The exponent c captures the degree of skewness and thus the degree of authorship concentration in the bibliometric distribution being analyzed. Specifically, smaller the value of c, higher is the degree of authorship concentration and thus stronger is the phenomenon of "success breeds success" or "cumulative advantage" in publication outcomes (Chung and Cox, 1990). Past empirical studies of bibliometric distribution patterns across many academic disciplines have generally found that as a discipline matures, the value of the exponent c empirically estimated from its bibliometric distribution gets closer to two as postulated by the original Lotka's Law (Huber, 2002). Therefore, in looking for disciplinary attribute measures that are consistent with evidence of maturity in the development of an academic discipline (Boyd et al., 2005), the empirically estimated value of the exponent c can be quite insightful.

Methods

Context and data

We now discuss the data for our study in the context of our aim to undertake the first systematic investigation of empirical regularities in bibliometric distribution patterns in the business ethics area. With respect to the selection of journals, we follow the approach used in past similar studies (e.g., Chung and Cox, 1990) in other academic disciplines and focus only on the leading journals in the business ethics area. Given this focus of our study, it behooves that we use the leading research journals in the specific domain of *business* ethics than in the general domain of ethics. Although the process of identifying the leading research journals in any disciplinary area is not an "exact science" based on "unanimous conclusions," generally a consensus emerges among the respective researchers in a discipline (Mittal et al., 2008; Rainer and Miller, 2005). In the business ethics disciple, such consensus arguably points to the following two as its leading journals (Karen, 2004; Tseng et al., 2010; Wicks and Derry, 1996): viz., *Business Ethics Quarterly* (BEQ) and *Journal of Business Ethics* (JBE). Accordingly, in this study, we select both these journals for our analyses. From now onward, in this article, we will refer to these selected two journals by their respective abbreviations (noted in parentheses above). It is worth noting here that JBE is the only business ethics journal that appears in the lists created by both *Financial Times* and *Business Week* to identify the leading business journals for ranking research productivity of business schools (Karen, 2004).

Given the relative "youth" of business ethics itself as a formal academic discipline (Dean 1997), it is not surprising that both its leading journals are relatively "young." Specifically, the inaugural years of the JBE and BEQ are 1982 and 1991, respectively. The scope of our study encompasses all the research papers (articles and notes) published in each of the selected two journals from the respective inaugural issues through the end of November 30, 2009 – the latest time possible before carrying out data analyses for the study. The specific last issues covered in our data are Volume 89 (Issue 4) for JBE and Volume 19 (Issue 4) for BEQ. Table II shows the scope of our data in terms of the source journals, number of articles, and time periods covered.

As in similar existing studies in related disciplines like economics and finance areas (Chung and Cox 1990; Cox and Chung 1991), we exclude publications that are comments and rejoinders; and in cases of multiple authorships, we use the "normal count," i.e., each author of an article receives full credit. Such common approach in selecting valid publications and authorship counts ensures that our findings are comparable to those from the past studies, especially in the sister disciplines within the business management area. All together, the data set for our study consists of 3679 published papers by 4030 distinct authors across the selected two journals; the break-up by journals is shown in the last two columns in Table II. Our data set essentially represents the

TABLE II

Scope of the data used in this study

Business Ethics Journal (Abbreviation)	Inaugural year	Scope of the data used in this study		
		Time period and issues covered	Number of published papers	Number of distinct authors
Business Ethics Quarterly (BEQ)	1991	19 Years; all issues from the inaugural issue in 1991 to issue 4 (volume 19, 2009)	478	413
Journal of Business Ethics (JBE)	1982	28 Years; all issues from the inaugural issue in 1982 to issue 4 (volume 89, 2009)	3201	3846
Both Journals	–	–	3679	4030[a]

[a]The total number of distinct authors is not the same as the sum (413 + 3846 = 4259) of the distinct number of authors across the two journals, because 229 authors have published papers in both the journals.

comprehensive, cumulative research outputs in the two top business ethics journals over the last three decades since their launches to a very recent date.[2] The interesting question that we want to address is whether the research productivity pattern underlying this cumulative research outputs shows any systematic evidence of empirical regularity; and if so, how does it compare to those found in more mature business disciplines like economics, finance, and accounting.

Empirical analysis approaches

As with our data organization approach, our empirical analysis approaches also closely follow those used in analogous studies in the economics, finance, and accounting literature (Chung and Cox, 1990; Chung et al., 1992; Cox and Chung, 1991). Such similarity in both data organization and analysis approaches ensures that we have a consistent framework for comparison of our findings with the past findings. Accordingly, we organize our empirical analyses into two sets of evidence testing. First, we investigate the question of whether Lotka's Law provides a consistent empirical characterization of the bibliometric distribution patterns observed in the selected leading disciplinary journals. The statistical test used to address this question is the χ^2 goodness-of-fit test between the theoretical frequency distribution of authorship as predicted by the original Lotka's Law (see earlier Eqs. 4–7) and the respective empirically observed distributions in our data (Cox and Chung, 1991).

Next, we apply the Generalized Lotka's Law to further examine the nature of empirical regularities 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 two journals individually and as a group. This is done by statistically fitting the bibliometric distribution function of Generalized Lotka's Law in Eq. 8 to the empirical observed distributions in our data. For this, we note that Eq. 8 can be expressed as

$$a_n/a_1 = 1/n^c \tag{9}$$

Taking the log of both sides of 9, we get

$$\log(a_n/a_1) = -c\log(n) \tag{10}$$

Following past similar studies, the exponent c is obtained by empirically estimating Eq. 10 above as a linear regression equation (Chung and Cox, 1990).

Empirical analysis results

We now proceed to discuss the results from our empirical analyses based on the data and analysis approaches as noted above.

Original Lotka's Law: tests and findings

Based on our data set, Table III shows the total number of published papers, the number of distinct

TABLE III

Bibliometric distribution patterns in the two leading business ethics journals: actual versus as predicted by Lotka's Law

Journal	Number of papers published	Number of distinct authors	Publication frequency distribution in percent									χ^2 statistics for Lotka's Law
			1	2	3	4	5	6	7	8	9	>9	
BEQ	478	413	71.7	14.1	6.3	3.4	1.9	0.7	0.7	0.7	0.5	0.00	80.5
JBE	3201	3846	76.7	13.3	4.7	1.8	1.5	0.7	0.5	0.3	0.1	0.4	103.6
Both Journals	3679	4030	74.8	13.7	4.9	2.3	1.5	0.8	0.5	0.4	0.4	0.7	77.9
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.

authors, and the proportion of authors by the number of publications[3] in each of the selected two leading business ethics journals – separately and in combination. What is immediately apparent from Table III is the highly skewed nature of the publication distributions. Assuming a high "competitive demand" among business ethics scholars to publish in their two top disciplinary journals, the skewed publication distributions reflect the significantly lower "odds of success" for *repeated* publications relative to the *first-time* publication in those journals.[4] Percentages of authors with just one publication range from 71.7 for BEQ to 76.7 for JBE. For the two journals combined, among 4030 authors, an overwhelming majority (74.8%) has published only once, and only 2.8% of authors have published more than five papers.

How do the aforesaid empirically observed rates for multiple publication "hits" in the business ethics discipline compare to those observed in sister disciplines in the business management area? For instance, compared to our finding that only 2.8% of authors have published more than five papers in the leading business ethics journals, the corresponding figures are 11.5% in the leading economics journals (Cox and Chung, 1991), 8.5% in the leading finance journals (Chung and Cox, 1990), and 9.8% in the leading accounting journals (Chung et al., 1992). However, to put this lower rate for more than five publication "hits" in the leading business ethics journals in proper perspective, it is important to recognize that such rate will be inherently lower for a relatively young discipline because of the fewer number and relative "youth" of its leading journals. For instance, the list of the top 40 leading business journals by *Financial Times* consists of four journals in the finance area but two journals in the business ethics area (Karen 2004). Also, the average "ages" of those listed journals are about 42 years and 24 years in the finance and business ethics areas respectively.

As for the question of whether Lotka's Law provides a consistent empirical characterization of the bibliometric distribution patterns observed in the leading journals in the business ethics area, we find mixed evidence. Based on the earlier Eqs. 4–7, the last row in Table III shows the theoretical frequency distribution of authorship as predicted by the original Lotka's Law. Comparison of this theoretical with actual frequency distributions of authorship for each of the selected journals separately and as well as in combination underscores significant similarity in the overall pattern of the distributions, i.e., being highly skewed toward the lower end of publication productivity range. At the same time, the χ^2 goodness-of-fit test shows that we can statistically reject ($p < 0.01$) the null hypothesis that the original Lotka's Law provides a good statistical fit for the observed bibiliometric distribution patterns – for the journals individually or as a group. The last column of Table III shows the results from the test.

Generalized Lotka's Law: tests and findings

Our analysis so far confirms that the observed bibliometric distribution patterns in the leading journals in the business ethics area exhibit highly skewed patterns consistent with an underlying inverse power law type of distribution. However, it also shows that the observed distribution patterns do not specifically correspond to an inverse *square* law (for which the exponent c in Eq. 8 would have a value of two) type

TABLE IV

Testing the Generalized Lotka's Law of bibliometric distribution pattern for the two leading business ethics journals

Journal	Exponent c of the Generalized Lotka's Law			Overall fit (Adj. R^2)
	Estimate	SE	t Value	
BEQ	2.31	0.04	55.27	0.99
JBE	2.74	0.07	41.96	0.99
Both Journals	2.59	0.05	56.35	0.99

of distribution as postulated by the original Lotka's Law. Therefore, we now apply the Generalized Lotka's Law to further examine the nature of empirical regularities in bibliometric distribution patterns of the selected journals. As noted in "Methods" section earlier, this is done through empirical estimation of Eq. 10 as a linear regression equation by forcing the intercept term to be zero[5] (Chung and Cox, 1990). The regression results based on our data are presented in Table IV.

As the regression results in Table IV 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 two journals individually and in combination. Specifically, the adjusted R^2 value in each case is 0.99. The remarkably high adjusted R^2 values in our analysis are quite comparable to those found in similar studies in related business management disciplines like economics, finance, accounting, and computer science (Chung and Cox 1990; Chung, Pak and Cox 1992; Cox and Chung 1991; Subramanyam 1979). Therefore, consistent with similar conclusion reached in past studies with respect to patterns of research productivity in more mature business management disciplines, we also find the Generalized Lotka's Law to be an excellent predictor of the pattern of research productivity in the business ethics discipline.

From Table IV, we also note that the estimated values of the exponent c range from 2.31 to 2.74 across the two journals individually and in combination. This contrasts with a postulated value of two for the exponent c in the original Lotka's Law. In other words, our estimated values of the exponent c along with the high adjusted R^2 values indicate that the general inverse power law type distributions (postulated in Generalized Lotka's Law) do provide a statistically near perfect description of the observed bibliometric distribution patterns in the business ethics journals, but the specific inverse power square law (postulated in original Lotka's Law) does not. We should note that this conclusion based on the regression results corroborates our earlier similar conclusion drawn from the results of χ^2 goodness-of-fit test between actual frequency distribution pattern and that predicted by Lotka's Law.

An interesting issue here is with regard to the relative degree of authorship concentration across the two leading business ethics journals. As noted earlier, empirical estimates of the value of the exponent c in the Generalized Lotka's Law measure such relative degrees of authorship concentrations with lower values indicating higher concentrations, thus greater evidence for the phenomenon of "success breeds success" or "cumulative advantage" in publication outcomes. Since the postulated value of the exponent c is equal to two in the original Lotka's Law, Table IV shows that the authorship concentrations in the two leading business ethics journals to be lower than would be predicted by the original Lotka's Law. At the same time, it also shows that BEQ exhibits a relatively higher authorship concentration (with $c = 2.31$) than JBE (with $c = 2.74$). These findings raise a further interesting and important question: Is the phenomenon of "success breeds success" or "cumulative advantage" in publication outcomes markedly different in the leading journals of the business ethics discipline compared to those observed in the leading journals of sister disciplines within the business management area?

In other words, are the levels of authorship concentrations in the leading business ethics journals markedly different from those in other related business disciplines? In order to get insights into that question, we first use the recent study by Mittal et al.

(2008) to identify the leading journals in several other areas within the broader business management discipline. Then we carefully search through the literature to find studies that have systematically investigated the bibliometric distributions of any of the leading journals identified in step one. Table V summarizes the findings from such studies in terms of the empirical estimates of the exponent c from fitting the Generalized Lotka's Law to relevant bibliometric distributions. Since our estimates of the exponent c are based on identical data organization and analysis approach used in the other studies, the findings are quite comparable across all the studies.

As evident from Table V, comparisons of the empirically estimated values of c of the leading journals across the business ethics, economics, finance, accounting, and information systems areas show that while the values are generally very similar (being clustered between 2.0 and 3.0), they tend to be on the lower side for the journals in the finance areas. Interestingly, the *Journal of Financial Economics,* which is arguably one of the most reputed journals in the finance area, has the lowest empirical estimate (1.95) of the exponent c among all the leading journals across the five disciplinary areas in Table V. In contrast, the *Quarterly Journal of Economics*, which is arguably one of the most reputed journals in the

TABLE V

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

Journals	Empirical estimate of the exponent c in the Generalized Lotka's Law	Source
Business ethics area	2.59	This study
Business Ethics Quarterly	2.31	
Journal of Business Ethics	2.74	
Economics area	1.84	Cox and Chung (1991)
American Economic Review	2.31	
Econometrica	2.35	
International Economic Review	2.86	
Journal of Political Economy	2.66	
Quarterly Journal of Economics	3.11	
Rand Journal of Economics[a]	2.74	
Review of Economics and Statistics	2.95	
Review of Economic Studies	2.58	
Finance area	≈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	
Accounting area	1.92	Chung et al. (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	
Information systems area	≈2.00	Subramanyam (1979) and
Communications of the ACM	≈3.00	Radhakrishnan and Kernizan (1979)

[a]Formerly known as *Bell Journal of Economics*.

economics area, has the highest empirical estimate (3.11) of the exponent *c*. In other words, the *Journal of Financial Economics* and the *Quarterly Journal of Economics* exhibit the highest and the lowest degrees of authorship concentration among all the leading journals in Table V. Taken together, our findings show that the degree of authorship concentrations – thus, the extent of the phenomenon of ''success breeds success'' or ''cumulative advantage'' in publication outcomes – in the leading business ethics journals is quite comparable to those observed in the leading journals in other related business management areas.

Concluding discussions

In this study, we empirically investigated the following inter-related interesting questions: Is there an empirical regularity in the bibliometric distribution patterns of the leading journals in the business ethics areas? If so, how does it compare across the leading journals in this discipline and with those of the leading journals in other sister business disciplines? Closely following the data collection and analysis approaches used for similar studies in the economics and finance literature, we used a comprehensive bibliometric data set of the two leading journals in the business ethics area to examine the aforesaid questions. The similarity in the approaches ensures that we have a consistent analysis framework for comparison of our findings with those from the past similar studies. Being the first of its kind in the business ethics discipline, our study thus provides the ''missing counterpart'' to similar studies in many other disciplines including sister business disciplines like economics, finance and accounting (Chung and Cox, 1990; Chung et al., 1992; Cox and Chung, 1991).

Our findings present strong evidence that there indeed exists a very distinct empirical regularity in the bibliometric distribution patterns in the business ethics discipline. It is the so-called Generalized Lotka's Law of scientific productivity pattern: the number of authors publishing *n* papers is about $1/n^c$ of those publishing one paper. We find that the estimated value of the exponent *c* to be 2.59 for the overall bibliometric data from the two leading journals in the business ethics discipline. That value is quite similar to those found for the respective leading journals in several other sister disciplines within the business management area.

Our findings underscore the remarkable applicability of the Generalized Lotka's Law of scientific productivity. The Generalized Lotka's Law has been found to hold not only in various natural science disciplines but also in various social science disciplines (refer to Table I earlier), including now in the business ethics discipline. This is all the more interesting and significant given the relatively young, evolving nature of this academic discipline and thus of its underlying research productivity pattern (Randall and Gibson, 1990; Tseng et al., 2010). By presenting systematic evidence to show that the patterns in research outputs generated by thousands of individual researchers in a relatively young academic discipline exhibit the same type of empirical regularity as found in more mature disciplines, our study points to a remarkable consistency in the underlying scientific knowledge creation process across diverse disciplines separated by topical scope and time. In the process, our study contributes to the broader research stream that seeks to identify empirical regularities in observed distribution patterns across diverse contexts in social and natural science areas (Andriani and McKelvey, 2009; Bettencourt et al., 2007; Gabaix, 1999; Whitfield, 2006). For example, such contexts have varied from identifying empirical regularity in distribution patterns of sizes across cities or firms to patterns of metabolic rates across mammals (Strogatz 2009)!

Apart from its obvious relevance to the wider academic community in uncovering the nature of research output patterns across diverse academic disciplines, our study is especially relevant to the business ethics academics in understanding several important aspects of their ''intellectual marketplace.'' For one, our findings in Table III on the publication frequency distributions are quite useful in assessing the relative standing of an individual researcher in the business ethics discipline in terms of research productivity in its two leading disciplinary journals. For example, Table III indicates that a researcher who has authored five publications in BEQ and JBE belongs to the 95 percentile group among researchers who have published in these top two business ethics journals. Such assessment of relative standing in terms of research productivity is naturally

of great interest and value to faculty members in any academic discipline for evaluating career progress and tenure prospects (Sabrine, 2002).

Also, the findings from our study shed interesting insights for business ethics academics when it comes to understanding the degree of ''market concentration'' and the consequent level of ''entry barrier'' in their ''intellectual marketplace.'' As noted in Table IV earlier, we find that the empirically estimated values of the exponent c in the Generalized Lotka's Law to be 2.31 for BEQ and 2.74 for JBE. Since a lower value of the exponent c indicates a higher authorship concentration level, our findings suggest that the phenomenon of ''success breeds success'' or the ''cumulative advantage'' in publication process is relatively stronger in BEQ than in JBE. In more practical terms, our findings thus suggest that new business ethics scholars are likely to be more successful in publishing in their leading disciplinary journals if they ''hit the ground running'' and get published early in their careers to better ''exploit'' the phenomenon of ''cumulative advantage.'' Also, it would be *relatively* less difficult for a new scholar to get her first publication success in JBE than in BEQ because of the stronger ''cumulative advantage'' enjoyed by the already published authors of BEQ. By the same token, once the scholar has a publication, it is *relatively* less difficult to get a subsequent publication in BEQ than in JBE.

In order to put our overall findings on research productivity patterns in the business ethics discipline in perspective, several important observations are in order. First, as our earlier discussions in the conceptual framework section note, the phenomenon of ''success breeds success'' or ''cumulative advantage'' is not unexpected when it comes to research publications in leading journals in any academic discipline. Rather, it is a natural upshot of the scientific knowledge creation process because of intrinsic differences in capability and motivation across researchers in any academic discipline. It also reflects the reality that the most accomplished researchers in a discipline, viz., those who have a higher publication productivity level are also the ones who concentrate their publication efforts through the top-tier publication outlets within the discipline (Chung and Cox, 1990; Swanson et al., 2007). Second, related to the previous point, a certain level of authorship concentration (reflecting cumulative advantage) in publication outputs in any academic discipline is thus not necessarily a ''cause for concern'' in itself. At the same time, it is however important and interesting to make systematic comparisons of such levels across disciplines.

Third, if comparisons of authorship concentration levels across academic disciplines show a markedly higher concentration level in any discipline, especially in a younger discipline like the business ethics, then that might reflect some ''systemic'' problem in the underlying knowledge creation process within the newer discipline. Such problem could be engendered by specific biases in the disciplinary journals' editorial board compositions and peer review processes (Hodgson and Rothman, 1999; Holbrook, 1986; Laband and Piette, 1994). Our findings show that the degree of authorship concentrations in the leading journals of the business ethics discipline is quite comparable to those observed in the leading journals of more mature business management disciplines like economics, finance, and accounting. In other words, compared to their peers in sister disciplines, new business ethics scholars experience very similar level of initial ''entry barrier'' as well as subsequent ''incumbent advantage'' when it comes to publication in their leading disciplinary journals.

As has been the case with similar studies, the focus of our study was on investigating empirical regularities in the patterns of bibliometric distributions in one specific academic discipline, and on what such regularities imply about authorship concentrations in that discipline's leading journals. A natural future extension, of course, would be to conduct similar studies in other specific business disciplines (e.g., general management, marketing) that lack such studies. Another future research direction would be to take a cross-disciplinary perspective and investigate the question: What drives differences in such bibliometric patterns and authorship concentrations across different academic disciplines and their leading journals? Since their already exists many studies in other disciplines that have looked into bibliometric patterns and authorship concentrations in their leading journals, those studies along with this study in the business ethics discipline can provide relevant information for a meta-analytic type of study to address the above question. Such a study will of course require careful measure and inclusion of

various factors like relative scope or specialization of a journal within a disciple, how old is the journal, and its relative reputation in terms of citation impact factors.

Notes

[1] In this context, readers may find the article by Gans and Shepherd (1994) to be very interesting. In their article, the concerned authors cite several specific instances of rejection of papers, which became seminal studies in economics. Referees and editors, according to Gans and Shepherd, 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 initial cases of 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'' (p. 171).

[2] While our data set is essentially a comprehensive collection of all research articles in the two selected journals for this study, it is worth noting that its scope compares quite favorably with past studies using bibliometric data in the business ethics area. For example, the data in the study by Robertson (2008) consist of one journal and cover 658 articles over a 10-year period, while those in the study by Tseng et al. (2010) consist of three journals and cover 3059 articles over a 10-year period.

[3] 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 author upon request.

[4] It is important to note that while the odd of success for repeated publication is low, it can still be the case that the *conditional* odd of success for repeated publication gets progressively higher, conditional on each publication success, which represents the phenomenon of ''cumulative advantage'' in publication process discussed earlier; our subsequent empirical analysis will shed insights into the relative strength of this phenomenon in the selected two journals on business ethics.

[5] As in the study by Cox and Chung (1991), we also run regressions allowing for an intercept term. In all the cases, we find the intercept term to be not statistically different (at significance level of 1% or less) from zero, which is consistent with the bibliometric distribution structure postulated in the Generalized Lotka's Law (see Eq. 10).

References

Akerlof, G. A.: 1970, 'The Market for ''Lemons'': Quality Uncertainty and the Market Mechanism', *The Quarterly Journal of Economics* **84**(3), 488–500.

Allison, P. D. and J. A. Stewart: 1974, 'Productivity Differences Among Scientists: Evidence for Accumulative Advantage', *American Sociological Review* **39**, 596–606.

Andriani, P. and B. McKelvey: 2009, 'From Gaussian to Paretian Thinking: Causes and Implications of Power Laws in Organizations', *Organization Science* **20**, 1053–1071.

Bettencourt, L. M. A., J. Lobo, D. Helbing, C. Kühnert and G. B. West: 2007, 'Growth, Innovation, and the Pace of Life in Cities', *Proceedings of the National Academy of Sciences* **104**, 7301–7306.

Bino, P. G. D., S. Sasidharan and R. Ananthakrishnan: 2005, 'Concentration in Knowledge Output: A Case of Economics Journals', *European Journal of Comparative Economics* **2**(2), 261–279.

Bookstein, A.: 1977, 'Patterns of Scientific Productivity and Social Change: A Discussion of Lotka's Law and Bibliometric Symmetry', *Journal of the American Society for Information Science* **28**(4), 206–210.

Boyd, B. K., S. Finkelstein and S. Gove: 2005, 'How Advanced is the Strategy Paradigm? The Role of Particularism and Universalism in Shaping Research Outcomes', *Strategic Management Journal* **26**, 841–854.

Chung, K. H. and R. A. K. Cox: 1990, 'Patterns of Productivity in the Finance Literature: A Study of the Bibliometric Distributions', *Journal of Finance* **45**(Mar.), 301–309.

Chung, K. H., H. S. Pak and R. A. K. Cox: 1992, 'Patterns of Research Output in the Accounting Literature: A Study of the Bibliometric Distributions', *Abacus* **28**(2), 168–185.

Chung, K. H. and R. Puelz: 1992, 'An Empirical Regularity in the Market for Risk and Insurance Research Output', *Journal of Risk & Insurance* **59**(3), 489–498.

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. and S. Cole: 1973, *Social Stratification in Science* (University of Chicago Press, Chicago).

Cox, R. A. K. and K. H. Chung: 1991, 'Patterns of Research Output and Author Concentrations in the Economics Literature', *Review of Economics and Statistics* **73**, 729–733.

Dean, P. J.: 1997, 'Examining the Profession and the Practice of Business Ethics', *Journal of Business Ethics* **16**, 1637–1649.

DiPrete, T. A. and G. M. Eirich: 2006, 'Cumulative Advantage as a Mechanism for Inequality: A Review of Theoretical and Empirical Developments', *Annual Review of Sociology* **32**, 271–297.

Feller, W.: 1968, *An Introduction to Probability Theory and Its Applications* (John Wiley and Sons, New York).

Friedman, M.: 1966, *The Methodology of Positive Economics, Essays in Positive Economics* (University of Chicago Press, Chicago).

Gabaix, X.: 1999, 'Zipf's Law for Cities: An Explanation', *The Quarterly Journal of Economics* **114**, 739–767.

Gans, J. S. and G. B. Shepherd: 1994, 'How Are the Mighty Fallen: Rejected Classic Articles by Leading Economists', *Journal of Economic Perspectives* **8**, 165–179.

Grove, W. and S. Wu: 2007, 'The Search for Economics Talent: Doctoral Completion and Research Productivity', *American Economic Review* **97**, 506–511.

Gupta, B., L. Sharma and S. Kumar: 1998, 'Literature Growth and Author Productivity Patterns in Indian Physics', *Information Processing & Management* **34**(1), 121.

Hodgson, G. M. and H. Rothman: 1999, 'The Editors and Authors of Economics Journals: A Case of Institutional Oligopoly', *Economic Journal* **109**, 165–186.

Holbrook, M. B.: 1986, 'A Note on Sadomasochism in the Review Process: I Hate When That Happens', *Journal of Marketing* **50**, 104–106.

Huber, J.: 1998, 'The Underlying Process Generating Lotka's Law and the Statistics of Exceedances', *Information Processing & Management* **34**(4), 471.

Huber, J.: 2002, 'A New Model that Generates Lotka's Law', *Journal of the American Society for Information Science & Technology* **53**(3), 209.

Kahn, W. A.: 1990, 'Toward an Agenda for Business Ethics Research', *Academy of Management Review* **15**(2), 311–328.

Karen, P.: 2004, 'Business and Society and Business Ethics Journals: A Citation and Impact Analysis', *Journal of Scholarly Publishing* **35**(2), 103–117.

Koenig, M. and T. Harrell: 1995, 'Lotka's Law, Price's Urn, and Electronic Publishing', *Journal of the American Society for Information Science* **46**(5), 386–388.

Laband, D. and M. Piette: 1994, 'Favouritism Versus Search for Good Papers: Empirical Evidence Regarding the Behaviour of Journal Editors', *Journal of Political Economy* **102**, 194–203.

Lotka, A. J.: 1926, 'The Frequency Distribution of Scientific Productivity', *Journal of the Washington Academy of Sciences* **16**, 317–323.

Lovell, M. C.: 1973, 'The Production of Economic Literature: An Interpretation', *Journal of Economic Literature* **11**, 27–55.

Mandelbrot, B.: 1954, 'Simple Games of Strategy Occurring in Communication Through Natural Languages', *I.R.E. Transactions on Information Theory* **3**, 124–137.

Merton, R. K.: 1973, 'The Mathew Effect in Science', in N. W. Storer (ed.), *The Sociology of Science* (University of Chicago Press, Chicago).

Mittal, V., L. Feick and F. Murshed: 2008, 'Publish and Prosper: The Financial Impact of Publishing by Marketing Faculty', *Marketing Science* **27**(3), 430–442.

Morris, S. and M. Goldstein: 2007, 'Manifestation of Research Teams in Journal Literature: A Growth Model of Papers, Authors, Collaboration, Coauthorship, Weak Ties, and Lotka's Law', *Journal of the American Society for Information Science & Technology* **58**(12), 1764–1782.

Murphy, L.: 1973, 'Lotka's Law in the Humanities', *Journal of the American Society for Information Science* **24**(6), 461–462.

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.

Radhakrishnan, T. and R. Kernizan: 1979, 'Lotka's Law and Computer Science Literature', *Journal of the American Society for Information Science* **30**(1), 51–54.

Rainer, R. K. and M. D. Miller: 2005, 'Examining Differences Across Journal Rankings', *Communications of the ACM* **48**(2), 91–94.

Randall, D. M. and A. M. Gibson: 1990, 'Methodology in Business Ethics Research: A Review and Critical Assessment', *Journal of Business Ethics* **9**(6), 457–471.

Robertson, C. J.: 2008, 'An Analysis of 10 Years of Business Ethics Research in Strategic Management Journal: 1996–2005', *Journal of Business Ethics* **80**, 745–753.

Rodgers, R. and N. Rodgers: 1999, 'The Sacred Spark of Academic Research', *Journal of Public Administration Research and Theory* **9**(3), 473–492.

Sabrine, M.: 2002, 'A Ranking of the Most Productive Business Ethics Scholars: A Five-Year Study', *Journal of Business Ethics* **36**, 355–379.

Schorr, A. E.: 1974, 'Lotka's Law and Library Science', *Reference Quarterly* **14**, 32–33.

Schorr, A. E.: 1975, 'Lotka's Law and Map Librarianship', *Journal of the American Society for Information Science* **26**(3), 189–190.

Simon, H. A.: 1955, 'On a Class of Skew Distribution Functions', *Biometrika* **42**, 425–440.

Solla, P. D.: 1976, 'A General Theory of Bibliometric and Other Cumulative Advantage Processes', *Journal of the American Society for Information Science* **27**(5/6), 292–306.

Stigler, G. J., S. M. Stigler and C. Friedland: 1995, 'The Journals of Economics', *Journal of Political Economy* **103**, 331–359.

Strogatz, S.: 2009, Math and the City. *The New York Times*, May 19.

Subramanyam, K.: 1979, 'Lotka's Law and the Literature of Computer Science', *IEEE Transactions on Professional Communication PC* **22**, 187–189.

Swanson, E. P., C. J. Wolfe and A. Zardkoohi: 2007, 'Concentration in Publishing at Top-Tier Business Journals: Evidence and Potential Explanations', *Contemporary Accounting Research* **24**, 1255–1289.

Tseng, H. C., C. H. Duan, H. L. Tung and H. J. Kung: 2010, 'Modern Business Ethics Research: Concepts, Theories, and Relationships', *Journal of Business Ethics* **91**(4), 587–597.

Voos, H.: 1974, 'Lotka and Information Science', *Journal of the American Society for Information Science* **25**, 270–272.

Waples, E. P., A. L. Antes, S. T. Murphy, S. Connelly and M. D. Mumford: 2009, 'A Meta-Analytic Investigation of Business Ethics Instruction', *Journal of Business Ethics* **87**, 133–151.

Whitfield, J.: 2006, *In the Beat of a Heart: Life, Energy, and the Unity of Nature* (Joseph Henry Press, Washington DC).

Wicks, A. C. and R. Derry: 1996, 'An Evaluation of Journal Quality: The Perspectives of Business Ethics Researchers', *Business Ethics Quarterly* **6**(3), 359–371.

Worthen, D. B.: 1978, 'Short-Lived Technical Literatures: A Bibliometric Analysis', *Methods of Information in Medicine* **17**, 190–198.

Wry, T. E.: 2009, 'Does Business and Society Scholarship Mater to Society? Pursuing a Normative Agenda with Critical Realism and NeoInstitutional Theory', *Journal of Business Ethics* **89**, 151–171.

Zivney, T. L. and W. J. Bertin: 1992, 'Publish or Perish: What the Competition is Really Doing', *Journal of Finance* **47**(1), 295–329.

State University of New York at Buffalo,
Buffalo, NY 14260, U.S.A.
E-mail: dtalukda@buffalo.edu