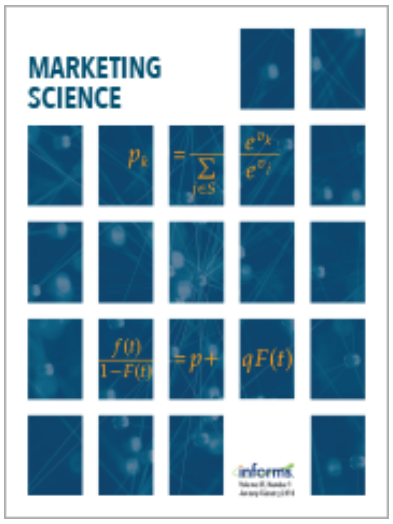

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Publish and Prosper: The Financial Impact of Publishing by Marketing Faculty

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This paper investigates the impact of research productivity on the salaries of marketing faculty members. We examine how the number of articles published in various types of publications affects faculty members' nine-month salary using a sample of three years of information on 298 marketing professors from 33 research-oriented, public universities. Consistent with research conducted in other disciplines, we find a positive impact of publishing on salary. We estimate the individual salary impact for each of the four top-tier journals in marketing, finding that the biggest impact on salary comes from publishing in *Marketing Science*. Further, we find that publishing in Tier 1 journals in marketing has a bigger salary impact than in Tier 1 journals outside marketing. Finally, we find that faculty and department characteristics also affect salary. For example, being from a higher ranked research university and being a full professor are each associated with higher salary.

Key words: research; financial impact; salary; publication
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1. Introduction

Conducting and publishing research is a key job requirement for faculty members at research universities (Shugan 2004a). Not surprisingly, research productivity—as measured by publications—is a critical determinant of career outcomes, especially salary (see Table 1). Although it has been documented empirically in business disciplines such as economics, finance, information systems, strategy, and organizational behavior, this relationship has never been examined in marketing.

This paper uses three years of data from a sample of 298 marketing professors employed at 33 geographically dispersed, research-oriented, public universities from 18 different states in the United States to examine the impact of publication record on salary. Our results offer new insights on the individual impact of the four commonly acknowledged top marketing journals: *Journal of Marketing* (*JM*), *Journal of Marketing Research* (*JMR*), *Journal of Consumer Research* (*JCR*), and *Marketing Science* (*MS*). We also examine the impact of factors such as seniority, gender, and department research ranking on salary.

Within marketing, journals have typically been compared based on criteria such as citation impact (Baumgartner and Pieters 2003, Leong 1989), diversity of content and methodology (Tellis et al. 1999), subjective impressions (Kamakura 2001), and perceived quality among marketing professionals (Fry et al. 1985, Hult et al. 1997). Contributing to this work, we introduce a market-based metric of brand equity for information brands such as academic journals.

Background and Research Issues

Our review of the existing research in Table 1 shows that research productivity is a strong predictor of academic salary. Although it has never been examined in marketing, the overall relationship should be similarly positive for marketing faculty. Marketing faculty, however, would benefit from knowing the *magnitude* and *nature* of the positive relationship between research productivity and salary. Several issues deserve particular attention.

First, if there is a positive association, will it persist after controlling for faculty characteristics such as seniority and sex? Labor economists (Hallock 1995, Ransom 1993) argue that research-productive faculty members are scarce resources whose salaries should be bid up independent of demographic factors. Harris and Holmstrom (1982) argue that initially universities

Table 1 Studies Examining the Relationship Between Research Productivity and Academic Salary

Study and sample	Highlights of key results
Katz (1973): 596 professors from 11 disciplines in a large university.	Publication record, teaching ability, and research ability (dissertations supervised) are the most important predictors of salary along with degree obtained from a top graduate school and gender.
Koch and Chizmar (1973): 229 professors, 16 departments of a public teaching university.	Academic rank and experience are the most important predictors of salary. Teaching is the strongest determinant of salary increments followed by scholarly productivity and service activities. Gender difference exits only in the absolute salary structure, not in salary increments.
Siegfried and White (1973): 45 economics professors at a public university.	Research output and administrative experience predict salary. Teaching quality is more important for professors with a good research record. Publishing books is not significant.
Ferber (1974): 115 professors at a large public university.	Research productivity determines promotion but not salary differences within a rank. Books (written and edited) negatively impact salary. Job employment duration only predicts salaries for males.
Gordon et al. (1974): About 1,500 professors at a university. Number protected to preserve anonymity of university.	Women earn less than men, and African Americans earn more than Caucasians. Salary increments for all groups are similar.
Johnson and Stafford (1974): 16,704 professors selected from NSF registers.	Although they start out as equal (4%–11% less), salaries of females decline leaving a large difference over time. Women are more likely than men to be employed at universities that emphasize teaching more than research.
Hamovitch and Morgenstern (1975): Faculty of a single university. Previous data from numerous studies.	Years of experience has a larger impact on salary than annual research output.
Hoffman (1976): ∼1,500 professors of a large university. Samples size not given—said similar to Gordon et al. (1974).	Females have lower promotion rate than males. Younger professors have faster increase in salary than older professors. Males and blacks earn higher salaries.
Freeman (1977): 102,000 ACE surveys from 301 institutions. Random sample for white, total count for black.	Within similar institutions, the most productive black professors have higher salary than similar white professors. The marginal value of an article has increased for black faculty between 1969 and 1974.
Tuckman et al. (1977): ACE survey of 12,685 university professors.	Articles and books have a stronger effect on salary than teaching. Administrative experience affects salary, but the return is diminishing in all disciplines. Women earn less than men.
Ferber et al. (1978): 306 faculty with an equal number of males and females from a public university.	Salaries of males are related more to experience while salary of women is related more to research performance. Publication rates among women (even those affected by career interruptions) are the same as males.
Smith and Choudhry (1978): 55 economics professors at a public university in Canada.	Years of experience, publication variety, and administrative jobs influence salary. Publications in major journals are rewarded initially but show diminishing returns over the first 10 articles, after which there are no diminishing returns. Teaching and articles in minor journals do not affect salary. Books do positively affect salary.
Schwab and Dyer (1979): 311 male professors of 200 institutions affiliated with the Industrial Relations Research Association.	Faculty, who alternate between academia and industry have higher salaries. Rank and time spent in administrative tasks affect salary but time spent in teaching and research does not.
Hamermesh et al. (1982): 148 full professors from 7 public universities.	Publications that are cited and used as reference affect salary much more than less-cited work. An additional reference increases salary more than an additional article or book.
Kaun (1984): 144 professors at different departments from UCSC of a teaching university	Teaching quality and length of service have the strongest impact on salary. Publishing books affects salary more than publishing articles. Degree from a prestigious institution negatively affects salary.
Diamond (1986): 45 professors of mathematics at a large and highly ranked public university.	Citations are positive and significant determinants of salary but the marginal value of a citation decreases with an increase in citations. Inclusion of nonfirst author citations has no effect.
Konrad and Pfeffer (1990): 5,645 professors across 200 different fields and universities.	The impact of research productivity on salary is stronger when institutions have strong norms of emphasizing research, private and higher quality institutions, more social research collaboration and social contracts, and collective bargaining agreements. Teaching hours are negatively related with salary.
Gomez-Mejia and Balkin (1992): 353 management professors who are members of the Academy of Management.	Publication in the top tier journals and changes in institution affiliation have the largest impact on salary. Teaching performance, citations, and second tier publications have an impact only for the faculty with exceptional publication record.

Table 1 (Cont'd.)

Study and sample	Highlights of key results
Ransom (1993): 1,100 professors across different disciplines in (University of Arizona) three public universities.	The negative relationship between seniority and salary persists after controlling for individual's publication records, education, and experience. Differences in publications records between high-seniority and low-seniority professors do not explain the negative returns to seniority.
Moore et al. (1998): 142 economics professors from nine public universities.	Seniority negatively affects salaries but this negative effect disappears as measures of research productivity such as journal quality and citations are added in the model.
Swidler and Goldreyer (1998): 311 finance professors from 29 public research universities.	Although positive, articles published in top-tier finance journals have diminishing returns for assistant and associate professors. However, returns are constant for full professors.
Gill (2001): Combination of 240 respondents (Hu and Gill 2000) and 156 usable salary offers (Galletta 2000).	The number and quality (journal ranking) of articles determine salary. The consistency between publication outlet and institution's standards and objectives also has a significant effect on salary. Moving increases salary.

are ill-informed about the potential productivity of faculty leading to similarly competitive offers. Over time, salaries are only bid up for productive professors. Consequently, while salaries are likely to be positively related to research productivity, they may be negatively related to seniority per se. Similarly, there is a question about the existence of a gender gap among faculty. Johnson and Stafford (1974) found that after controlling for productivity, female professors had lower salaries. The extent to which these issues apply to marketing needs to be empirically investigated.

Second, is the relationship linear? If not, are there increasing or decreasing returns to incremental publication? Tuckman and Leahey (1975) found that returns to publication of initial articles are higher than articles published later, although the decrease occurs at a diminishing rate. Similarly, Hansen et al. (1978, p. 737) found that among academic economists, "an additional unit of research productivity yields an almost 8% increase in annual earnings, which, however, diminishes at an increasing rate with the number of publications, reaching a zero increase in earnings at 32 publications." Freeman (1977), in contrast, found increasing marginal returns for publications by black faculty between the years 1969 and 1973. However, none of these studies controlled for the quality of publications. If earlier publications are of higher quality than later publications, and the university rewards higher-quality publications more, we would expect to see diminishing returns to publication. Ransom (1993) proposes a model of monopsonistic discrimination. If a university can pay a different salary to each current faculty member and individual faculty members incur moving costs, some segment of the faculty will choose to stay at wages that are below market despite increasing productivity. Thus, theoretical perspectives disagree. As such, it would be instructive to empirically examine returns to publication controlling for publication quality.

Third, does the relationship differ across the top-tier marketing journals? Within marketing, there is general agreement that four journals are in the top-tier: *Journal of Marketing* (*JM*), *Journal of Marketing Research* (*JMR*), *Journal of Consumer Research* (*JCR*), and *Marketing Science* (*MS*) (Baumgartner and Pieters 2003, Hult et al. 1997, Kamakura 2001, Tellis et al. 1999, Winer 1998). Despite their similar acceptance rates, there are many indications that external constituents perceive these journals differently. Several studies have documented the differences in perceived quality ratings and overall rankings for these journals (Coe and Weinstock 1983, Fry et al. 1985, Luke and Doke 1987, Vasilis and Hirst 2002, Shugan 2005, Stremersch and Verhoef 2005). In some cases, even analysis of the same data set has yielded different conclusions by different researchers. For example, in an analysis of references, Tellis et al. (1999) concluded that *JMR* and *JM* were more diverse than *JCR*, but Bettencourt and Houston (2001) reanalyzed the data to argue that *JCR* was more diverse than *JMR*. Thus, a perception that *JM* and *JMR* are more diverse (Tellis et al. 1999) and have a higher citation impact (Baumgartner and Pieters 2003) may cause some universities to reward publications in these journals more highly than others.

Variation in goals and objectives of marketing departments and schools across universities also may lead to different evaluations of the journals. For example, while one department may strive to gain general visibility in the marketing field, another may want to carve out a specialized niche, such as, consumer behavior. While the former may value a *JM* article more, the latter may reward publication in *JCR*. Such differences may also lead to differences in the reward structure based on publishing in particular journals. Differences in rewards can also be affected by supply asymmetries in the market. Surveys of marketing faculty (Dickson 2001, 2002) consistently have shown a

relative shortage of quantitatively oriented scholars—individuals who are more likely to publish in journals such as *MS* and *JMR*. This relative shortage could lead to a higher premium paid for articles published in those outlets as schools attempt to retain faculty with these more scarce skills. In summary, variance in perceived journal quality, department goals, and supply-side asymmetries may affect the differential salary impact of publishing in the different Tier-1 marketing journals.

Data and Measures

We focused on research-orientated (i.e., doctorate granting) marketing departments located in public universities. We restrict ourselves to public universities because salary data are available from secondary sources. We started with the universities included in the article by Swidler and Goldreyer (1998) and then added universities that met our inclusion criteria and for which we could obtain salary data. Overall, we generally follow the approach used by Swidler and Goldreyer (1998), who examined two years of data on 311 professors from 29 finance departments at public universities. We have three years of data from 298 marketing professors at 33 public universities in the United States (see Table 2). Twenty-two universities in their sample overlap with ours.

Our approach of using published salary data contrasts with studies that use faculty self-reports of salary and publication record collected via a cross-sectional survey (e.g., Gomez-Mejia and Balkin 1992). In addition to the problem of inaccurate and unreliable self-reports for sensitive topics such as salary (Swidler and Goldreyer 1998), cross-sectional data from a survey precludes modeling respondent-specific heterogeneity.

Table 2 Sample Composition

Name of university	Total number of professors
Arizona State University	12
Florida State University	12
Georgia State University	15
Georgia Institute of Technology	6
Indiana University, Bloomington	13
Michigan State University	8
Ohio State University	11
Purdue University	5
Texas A & M University	13
Texas Tech University	6
University of Arizona	6
University of California, Berkeley	6
University of Colorado, Boulder	6
University of Connecticut	8
University of Florida	9
University of Georgia	9
University of Houston	8
University of Illinois, Chicago	7
University of Illinois, Urbana-Champaign	10
University of Iowa	9
University of Kansas	6
University of Kentucky	7
University of Maryland	8
University of Memphis	7
University of Minnesota	13
University of Michigan	22
University of North Texas	9
University of Oklahoma, Norman	4
University of Texas, Arlington	9
University of Texas, Austin	11
University of Utah	7
University of Wisconsin, Madison	10
University of Wisconsin, Milwaukee	6
Total	298

Measures

Academic Salary. The primary dependent variable is each professor's nine-month salary for the academic years 1998–1999, 1999–2000, and 2000–2001. These data are obtained from university budget records. In cases where only the 12-month salary was available, we adjusted it to keep the data comparable. We use gross salary unadjusted for deductions such as those for income tax, social security, and retirement contributions. Our salary data exclude extra compensation in the form of matching contributions to retirement funds, bonuses, executive teaching, and faculty budget allowances. Also excluded is outside income such as consulting fees and royalties.

Research Productivity. Consistent with Gomez-Mejia and Balkin (1992) and Swidler and Goldreyer (1998), we measure research productivity as the number of publications in different types of outlets. We first divided publication outlets into either marketing or nonmarketing, depending on the primary readership. Within marketing, the publications are classified into three tiers based on the outlet (see Table 3(a)). Tier 1 includes *JM*, *JMR*, *JCR*, and *MS*. This definition of Tier 1 is widely acknowledged (e.g., Baumgartner and Pieters 2003, Kamakura 2001, Koojaroenprasit et al. 1998, Spake and Harmon 1998, Winer 1998). We also include Tier 2 outlets in Table 3(a). We

Table 3(a) Classification of Marketing Journals

Marketing Tier 1	Marketing Tier 2
Journal of Consumer Research	*International Journal of Research in Marketing*
Journal of Marketing	*Journal of Consumer Psychology*
Journal of Marketing Research	*Journal of Retailing*
Marketing Science	*Journal of the Academy of Marketing Science*
	Marketing Letters

Notes. Publications in all other marketing journals and outlets such as books, book chapters, conference proceedings, and book reviews are included as marketing Tier 3.

Table 3(b) Nonmarketing Tier 1 Journals

Accounting	*Accounting, Organizations and Society*
	Contemporary Accounting Research
	Journal of Accounting and Economics
	Journal of Accounting Research
	The Accounting Review
Finance	*Journal of Finance*
	Journal of Financial Economics
	Journal of Financial and Quantitative Analysis
	Review of Financial Studies
Information systems	*Communication of ACM*
	IEEE Transaction- Software Engineering
	Information Systems Research
	Journal of Management Information Systems
	MIS Quarterly
Management	*Academy of Management Journal*
	Academy of Management Review
	Industrial and Labor Relations Review
	Industrial Relations
	Personnel Psychology
	Business and Society
	Business Ethics Quarterly
Operations	*Decision Sciences*
	IIE Transactions
	International Journal of Production Research
	Mathematics of Operations Research
	Manufacturing & Service Operations Management
	Naval Research Logistics
	Operations Research
	SIAM Review
Business interdisciplinary	*Administrative Science Quarterly*
	Journal of Business
	Journal of International Business Studies
	Management Science
	Organizational Behavior and Human Decision Processes
	Organization Science
Practitioner-focused	*Harvard Business Review*
	Interfaces
	Sloan Management Review
Psychology	*Journal of Applied Psychology*
	Journal of Experimental Psychology
	Journal of Experimental Social Psychology
	Journal of Personality and Social Psychology
	Personality and Social Psychology Bulletin
	Personnel Psychology
	Psychological Bulletin
	Psychological Review
Economics	*American Economic Review*
	Econometrica
	International Economic Review
	International Journal of Industrial Organization
	Journal of Labor Research
	Journal of Political Economy
	Quarterly Journal of Economics
	RAND Journal of Economics
	Review of Economics and Statistics
	Review of Economic Studies
Other basic disciplines	*American Political Science Review*
	American Sociological Review
	Journal of American Statistical Association
	Mathematical Programming

Notes. All other nonmarketing journals are included as nonmarketing Tier 2. In other words, for nonmarketing journals, we do not distinguish between Tiers 2 and 3 journals.

chose journals for Tier 2 with three objectives in mind: developing a relatively short list, including more broadly focused marketing journals (rather than more narrowly focused on, for example, advertising, database marketing, public policy, or product management), and including a set consistent with rankings of journals such as Baumgartner and Pieters (2003) or Koojaroenprasit et al. (1998). All other marketing journals and outlets such as book chapters and conference proceedings are classified as Tier 3. Note that in so doing, online-only publications are excluded (Shugan 2004b).

The classification of nonmarketing journals was based on a list compiled by the administration of the university where the authors were employed during the 2000–2004 period. The list was based on a comprehensive analysis of studies assessing journal quality. The resulting list of nonmarketing Tier 1 journals is included in Table 3(b). Working papers or papers posted on the Internet alone are excluded from the analysis. In summary, the classification of publications used is as follows:

(a) Marketing Tier 1 (Table 3(a)).

(b) Marketing Tier 2 (Table 3(a)).

(c) Marketing Tier 3 (all other marketing journals, textbooks, edited books, book chapters, book reviews, monographs, and conference proceedings not included in (a) or (b) above).

(d) Nonmarketing Tier 1 (Table 3(b)).

(e) Nonmarketing Tier 2 (all publications in outlets not included in (a) through (d) above).

In this study, we do not calibrate the research output qualitatively using measures such as citation counts or article impact. First, because administrators generally set salary yearly and because citation counts for a particular article are not known at the time of publication, including citation counts for current productivity is impossible and would alter the interpretation of the results. Second, our approach recognizes that the choice of such quality indicators is subjective as evinced in the low to no correlation among the various indicators of even a single factor such as "impact" (Baumgartner and Pieters 2003). Third, this approach enabled us to maintain consistency with Swidler and Goldreyer (1998). Last, our goal is to assess the impact of publishing in particular journals, not the differential impact of articles in each journal.

Information Source. Our sample excludes part-time and visiting faculty. We contacted all the faculty members via e-mail and requested their c.v.s. We obtained vitae for 214 faculty members (71%). For the remaining 84 professors (29%), we used commercial data bases (such as ABI INFORM), directories, and journal indices to compile the publication record. Because these sources are likely to underreport productivity,

we included information source as a control variable in our analysis (0 = c.v., 1 = external source).

Faculty's Academic Rank. Academic rank was dummy-coded to define three levels: professor, associate professor, and assistant professor. The base category is assistant professor (coded as 0, 0) and the regression coefficient estimates of the other two ranks are relative to the assistant professor category.

Sex. This variable is coded as 0 for female, 1 for male.

Department Research Ranking. This variable was based on the research productivity ranking of various departments provided in Spake and Harmon (1998, Table 1, Column D). This index is essentially "publication per faculty member," calculated by dividing the fractional points earned by each faculty for publishing an article by the number of full-time marketing faculty. Thus, it accounts for the size of each marketing department.

Because the ranking includes many private universities and also ties, it was infeasible to simply use the calculated rank. Therefore, we used a tertile-split to construct a three-level indicator variable classifying the schools into high, medium, and low research productivity. The universities were split into three equal-sized groups. Because the number of professors in the universities varies, however, at the professor level, the proportions are not equal. Two dummy variables are used to code research productivity, with low productivity set as the base $(0, 0)$. The other two levels—medium $(1, 0)$ and high $(0, 1)$—are coded relative to this base category.

Time. Because we have three years of data, we included time as a covariate in the analysis to capture time-based changes (e.g., inflation or other macroeconomic factors affecting annual salary increases in a particular year across professors). We define time as (year − 1999), consequently, 1999 is coded as 0, 2000 is coded as 1, and 2001 is coded as 2. This centering focuses intercepts on the initial year of our data collection.

Approach to Analysis

Our data set is a cross-section with three repeated measures on the dependent variable and on which some but not all of the independent variables vary with time. The data set has a nested structure in which information is sampled at three levels: variables at level one vary by year, at level two by professor, and at level three by department. Appropriate for the analysis of such data is the hierarchical linear model (HLM), a general specification (Raudenbush and Bryk 2002) that subsumes as special cases models such as ordinary least squares (OLS), random-coefficient regression, and repeated-measures analysis of variance. Operationally, we use the following definitions of variables and levels:

Dependent variable: nine-month salary of a faculty member in a particular year.

Predictor variables:

Level 1

Year in which salary is measured (1999, 2000, or 2001), centered so that (time = year − 1999).

Number of publications in Tier 1 marketing journals (aggregated and disaggregated).

Number of publications in Tier 2 marketing journals (aggregated).

Number of publications in Tier 3 marketing journals (aggregated).

Number of publications in Tier 1 nonmarketing journals (aggregated).

Number of publications in Tier 2 nonmarketing journals (aggregated).

Professor's rank (assistant, associate, full).

Level 2

Sex.

Information source.

Level 3

Department's research productivity ranking.

Results

Descriptive Results

Table 4 includes descriptive statistics and a correlation matrix of the key variables in our study. Our sample of 298 marketing faculty members is 77% male. In the sample, 166 (55.7%) are full professors, 81 (27.2%) are associate professors, and 51 (17.1%) are assistant professors. Of the 33 departments, 26.9% are ranked highest on research productivity, 48.6% are middle-ranked, and 24.5 % are ranked low.

Table 5 includes descriptive statistics on publication by journal. The average number of Tier 1 marketing publications in our sample is 4.42, while Tier 2 is 1.78, and Tier 3 is 27.03. Looking at the four Tier 1 journals individually, the mean number of publications in *JMR* is highest (1.69), while *MS* is lowest (0.37). Mean publications outside marketing are 1.16 (Tier 1) and 0.45 (Tier 2). Table 5 shows that 24.49% of the sample has never published in any of the Tier 1 marketing journals. Further, 51.70% of the professors in our sample have never published in *JM*, with 45.58%, 62.93%, and 80.27% never having published in *JMR*, *JCR*, and *MS*, respectively. The high percentage of marketing faculty who never have published in *MS* may reflect the fact that at the public research universities included in our sample, the proportion of faculty who can be considered as having a modeling or quantitative orientation is relatively low. In addition, for each of the Tier 1 journals separately, the modal number of publications among professors

Table 4 Descriptive Statistics and Correlation Matrix

	Mean	Std. dev.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Salary	98,307	27,792	1										
2. Marketing (Tier 1)	4.42	5.07	0.61	1									
3. *JM*	1.15	2.21	0.43	0.63	1								
4. *JMR*	1.69	2.45	0.46	0.79	0.32	1							
5. *JCR*	1.20	2.24	0.30	0.59	0.06$^{n.s.}$	0.23	1						
6. *MS*	0.37	0.96	0.34	0.42	0.07	0.35	0.06$^{n.s.}$	1					
7. Marketing (Tier 2)	1.78	2.37	0.32	0.22	0.24	0.13	0.04$^{n.s.}$	0.18	1				
8. Marketing (Tier 3)	27.03	28.99	0.33	0.25	0.26	0.09	0.20	0.03$^{n.s.}$	0.36	1			
9. Nonmarketing (Tier 1)	1.16	2.52	0.34	0.25	0.16	0.16	0.13	0.27	0.18	0.25	1		
10. Nonmarketing (Tier 2)	0.45	1.70	0.09	0.15	0.07	0.05$^{n.s.}$	0.12	0.18	0.01$^{n.s.}$	0.12	0.04$^{n.s.}$	1	
11. Sex	0.77	0.41	0.18	0.18	0.19	0.19	−0.02$^{n.s.}$	0.12	0.09	0.13	0.14	0.10	1

Notes. All correlation coefficients, except those designated by "n.s." are significant at the 5% level. The reported correlation matrix is based on all three years of data. Sex is coded as 0 = female, 1 = male.

who have published at least one article in the journal is one.

As expected, the number of publications by faculty is significantly correlated with their salary (see Table 4). The correlations range from 0.61 (Marketing Tier 1) to 0.09 (Nonmarketing Tier 2). Publishing in *JMR* is correlated with publishing in *JM* ($r = 0.32$, $p < 0.01$), *JCR* ($r = 0.23$, $p < 0.01$), and *MS* ($r = 0.35$, $p < 0.01$). None of the other Tier 1 marketing journals is as strongly correlated with the others. For example, the correlation between publishing in *JM* and *JCR* is very low ($r = 0.06$, $p > 0.05$) as is the correlation between *JM* and *MS* ($r = 0.07$, $p < 0.05$). *MS* and *JCR* are also unrelated ($r = 0.06$, $p > 0.05$). This pattern of results is consistent with Kamakura's (2001, p. 1) assertion that *JMR* is "positioned somewhere in the middle of the three other major marketing journals."

In Table 6, publications and salary are broken down by professor's rank, sex, and department research productivity. As expected, full professors not only have significantly more Tier 1 publications (6.48) than their counterparts (2.17 for associate and 1.17 for assistant), but also higher salary than their counterparts ($110,530 versus $84,013 and $80,218). Interestingly, males have significantly more publications (4.91 versus 2.69) and higher salary ($100,987 versus $88,781) than females. Faculty members in higher-ranking departments have significantly more Tier 1 marketing publications (6.89) than those in medium- (4.33) or low-(1.91) ranking departments. There is a statistically significant difference in salary across universities, with faculty at departments ranked as high in research productivity ($111,409) earning more than those at departments ranked as medium ($98,915) or low ($83,036). Interestingly, there is no difference across departmental rankings on publishing records in either Tier 3 marketing or Tier 2 other publications. We discuss these results in more detail in later sections when interpreting the results from the multivariate estimation.

Model Specification and Estimation

Model specification and estimation recommendations for hierarchical liner models are discussed in a

Table 5 Frequency Count of Publishing in the Four Tier 1 Marketing Journals

Number of publications	*Journal of Marketing*		*Journal of Marketing Research*		*Journal of Consumer Research*		*Marketing Science*		Marketing Tier 1	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
0	152	51.70	134	45.58	185	62.93	236	80.27	72	24.49
1	70	23.81	46	15.65	33	11.22	31	10.54	36	12.24
2	31	10.54	41	13.95	24	8.16	14	4.76	29	9.86
3	16	5.44	21	7.14	13	4.42	5	1.70	25	8.50
4	10	3.40	16	5.44	15	5.10	4	1.36	29	9.86
5	2	0.68	11	3.74	6	2.04	2	0.68	10	3.40
6	4	1.36	9	3.06	3	1.02	1	0.34	13	4.42
7	3	1.02	5	1.70	5	1.70	1	0.34	14	4.76
8	1	0.34	4	1.36	4	1.36	0	0	12	4.08
9	2	0.68	1	0.34	3	1.02	0	0	11	3.74
10 or more	3	1.11	6	2.04	3	1.04	0	0	43	14.63
Total	294	100	294	100	294	100	294	100	294	100

Notes. For each journal, the first column indicates the number of professors publishing the corresponding number of articles. These counts are based on data from 2001. Data for 2001 are not available for four professors, and hence the smaller sample size.

Table 6 Research Productivity and Salary by Sex, Academic Rank, and Department's Research Productivity

	Sex		Academic rank			Dept. research productivity		
	Male 1	Female 2	Full 3	Associate 4	Assistant 5	High a	Medium b	Low c
Marketing—Tier 1	4.91 2	2.69 1	6.48 4/5	2.17 3/5	1.17 3/4	6.89 bc	4.33 ac	1.91 ab
Marketing—Tier 2	1.89 2	1.38 1	2.14 4/5	1.66 3/5	0.70 3/4	1.82 c	2.07 c	1.15 ab
Marketing—Tier 3	29.12 2	19.75 1	37.28 4/5	16.74 3/5	9.53 3/4	26.97	28.05	25.08
Nonmarketing—Tier 1	1.35 2	0.51 1	1.73 4/5	0.48 3	0.36 3	2.02 bc	1.08 ac	0.40 ab
Nonmarketing—Tier 2	0.54 2	0.12 1	0.70 4/5	0.17 3	0.06 3	0.55	0.45	0.33
Nine-month salary	100,987 2	88,781 1	110,530 4/5	84,013 3	80,218 3	111,409 bc	98,915 ac	83,036 ab

Note. Letters/numbers in the second row of each cell indicate significant difference ($p < 0.05$) between corresponding cells in each row.

number of sources (e.g., Raudenbush and Bryk 2002). Particularly relevant for us are the recommendations of Singer (e.g., Singer 1998, Singer and Willett 2003) because she focuses on time-series models within the HLM framework. In addition, our specification and modeling process follows closely those used by Mittal et al. (2005) and Steenbergen and Jones (2002). We used Proc Mixed in the SAS software to produce maximum likelihood estimates of the model's parameters.[1] Note that in model formulation, at issue is not variable selection—the variables predicting salary are a priori determined—but estimating the impact of these variables on salary. To this latter end, a series of nested models are estimated and compared.

We start with a base model that includes no level 1, 2, or 3 predictor variables. This model does, however, account for the impact that grouping at levels 2 and 3 has on violating the assumption of independence of the errors. This model has one fixed effect (intercept) and three variance components—one representing the variation between university mean salaries, another representing the variation in salaries among professors within universities, and the other representing variation in salaries over time within individuals. The deviance measure for this model (−2 LL) is 19,425.1 and the Akaike Information Criterion (AIC) is 19,431.1. The estimate of the intercept is significant (97,337, $p < 0.0001$) as are the estimates of each of the variance components. We estimated intraclass correlations to evaluate the portion of total variance in salaries that occurs at each level. We found that 10.7% of the total variance is accounted for by individual changes over time and 18.1% by differences among universities. The largest component of the variance is the 71.2% accounted for by individual differences among professors.

Next, we estimate a model that introduces predictors into the model. These predictors include the time-varying covariates (level 1: time, publication record, academic rank) along with professor level (level 2: professor's sex, information source), and department-level covariates (level 3: departmental research-productivity ranking). Our overall goal is to determine the fixed effects of publication record on salary and we regard the other variables in the model as control variables. Therefore, we specify a model in which we introduce the level 2 covariates through a model of the level 1 intercept and introduce the level 3 covariate by modeling the level 2 intercept. In so doing, we simplify the specification by including only fixed effects of the slope parameters and do not include any cross-level interaction terms. Thus, for example, we assume that the salary impact of publication in a particular journal does not vary by sex. We continue to incorporate variance components for each level. Parameter estimates are included in Table 7.

Model Estimates

Column 1 of Table 7 shows the model described above with disaggregated estimates of Tier 1 marketing journals. For this disaggregated model, the deviance measure is 18,618.4 and the AIC is 18,656.4. Column 2 shows the estimates for the aggregated model, a formulation that is comparable to past research that does not distinguish between different journals (e.g., Swidler and Goldreyer 1998). For the aggregated model, the deviance measure is 18,625.5 and the AIC is 18,657.5.

Research Productivity and Salary: *Individual Journals*. Column 1 in Table 7 shows the model in which the

[1] We used full rather than restricted maximum likelihood because it enables model comparison for both the fixed and random components of the model (Singer and Willett 2003).

Table 7 Regression Models for Nine-Month Salary

Tier 1 marketing journals (disaggregated)		Tier 1 marketing journals (aggregated)	
Variables	Estimate	Variables	Estimate
Intercept	59,709.00***	Intercept	59,192.00***
Time	6,479.25***	Time	6,454.05***
Marketing—Tier 1		Marketing—Tier 1	2,176.25***
JM	2,688.05***		—
JMR	1,907.87***		—
JCR	1,583.27***		—
MS	4,130.78**		—
Marketing—Tier 2	1,597.75***	Marketing—Tier 2	1,777.95***
Marketing—Tier 3	131.20**	Marketing—Tier 3	124.85**
Nonmarketing—Tier 1	730.74*	Nonmarketing—Tier 1	843.71*
Nonmarketing—Tier 2	−167.96	Nonmarketing—Tier 2	−137.76
Acad. rank: Associate	1,473.82	Acad. rank: Associate	1,449.48
Acad. rank: Full	9,922.72***	Acad. rank: Full	9,708.44***
Sex	1,141.82	Sex	1,911.96
Information source	3,439.90	Information source	3,676.87
Dept. research rank: Medium	6,837.28	Dept. rank: Medium	6,417.14
Dept. research rank: High	14,080.00***	Dept. rank: High	14,426.00**
AIC	18,656.4		18,657.5
BIC	18,684.8		18,681.5
−2LL	18,618.4		18,625.5
Random effects		Random effects	
Level 1: Within person, over time	29,812,079***	Level 1: Within person, over time	29,882,557***
Level 2: Variance in intercept	270,420,000***	Level 2: Variance in intercept	276,470,000***
Level 3: Variance in intercept	40,648,610**	Level 3: Variance in intercept	40,238,062***

Notes. Estimation is full maximum likelihood using SAS Proc Mixed. Dummy variable coding: Acad. rank: assistant professor is the base category. Sex: female = 0, male = 1. Information source: vita = 0, other source = 1. Dept. research rank: departments ranked in lowest third set as the base category.

*$p =< 0.05$; **$p =< 0.01$; ***$p =< 0.001$.

four Tier 1 marketing journals are incorporated as separate predictors. *MS* has the largest coefficient ($\beta = 4{,}130.78$, $p < 0.01$), followed by *JM* ($\beta = 2{,}688.05$, $p < 0.001$), *JMR* ($\beta = 1{,}907.87$, $p < 0.001$), and *JCR* ($\beta = 1{,}583.27$, $p < 0.001$). A comparison of the coefficients using the asymptotic *t*-test (Ben-Akiva and Lerman 1985) shows that the coefficient for *MS* is not significantly different from that for *JM* ($p > 0.10$). It is, however, marginally different than that of *JMR* ($p < 0.10$, 2-tailed) and significantly different than that of *JCR* ($p < 0.05$, 2-tailed). It is also significantly different than that of nonmarketing Tier-1 journals ($p < 0.01$, 2-tailed).

We also estimated a model that allowed a nonlinear relationship between publication and salary. The nonlinearity was modeled with a quadratic term because it allows for both increasing and decreasing returns to publications: a negative coefficient for the square term would be consistent with the hypothesis of diminishing returns of publication on salary. All of the squared terms were statistically nonsignificant indicating there is no empirical support for a nonlinear relationship between publication and salary. Hence, the quadratic models are not discussed further.

Research Productivity and Salary: *Aggregate Results*. The second pair of columns of Table 7 shows that publications in Tier 1 marketing outlets ($\beta = 2{,}176.25$, $p < 0.001$) as well as publications in Tier 2 marketing outlets ($\beta = 1{,}777.95$, $p < 0.001$) have a statistically significant impact on salary. Notably, the difference in the impact for Tiers 1 and 2 publications was not statistically significant ($p > 0.10$, 2-tailed test). The impact of Tier 3 marketing outlets is statistically significant but extremely small ($\beta = 124.85$, $p < 0.05$). The impact of Tier 3 marketing publications on salary is significantly smaller than both Tiers 1 and 2 publications (for both, $p < 0.05$, 2-tailed test). Publication in Tier 1 nonmarketing journals has a significant impact on salary ($\beta = 843.71$, $p < 0.05$) but the effect is significantly smaller than publication in Tier 1 marketing journals ($p < 0.01$, 2-tailed). Publication in Tier 2 nonmarketing journals, however, has no impact on salary ($\beta = -137.76$, $p > 0.10$). Finally, similar to the disaggregated model, no quadratic effects are statistically significant.

Professor Characteristics. The coefficients of faculty characteristics are consistent when comparing the aggregated and individual journal models in Table 7. To conserve space, we only discuss results for the disaggregated estimation (Column 1). There is a statistically significant impact of a faculty member's academic rank on salary. Relative to an assistant professor (the base case), an associate professor's salary is not significantly higher ($\beta = 1{,}473.82$, $p > 0.10$),

although a full professor ($\beta = 9{,}922.72$, $p < 0.001$) has a higher salary. The difference between an associate professor and full professor is statistically significant ($p < 0.05$, 2-tailed). This result is consistent with Hallock (1995) but not with Ransom's (1993) model of monopsonistic discrimination which postulates that as seniority increases, so do the direct and indirect costs of moving.

The impact of gender is directionally consistent with previous results (higher salaries for males than for females adjusting for research productivity; see Bayer and Astin 1968, Ferber and Kordick 1978, Gordon et al. 1974, Hoffman 1976, Johnson and Stafford 1974) but is not significant ($\beta = 1{,}141.82$, $p > 0.10$). Finally, there is a significant impact of a department's research productivity ranking on salary. Compared to the base case (low productivity) and departments with medium productivity ($\beta = 6{,}837.28$, $p > 0.05$), faculty in departments with high productivity ($\beta = 14{,}080.00$, $p < 0.001$) are paid more.

Additional Analysis: To examine the robustness of our results, we compare our HLM estimates to ones obtained by OLS regression. The OLS results are reported in the appendix. The first set of estimates is based on a data set that includes all three years for each individual but ignores the repeated-measures nature of the data. Next, we report cross-sectional estimates for each of the three years. The OLS estimates are similar to those based on HLM estimation.

Discussion

Based on our sample of 298 professors from 33 research-oriented marketing departments in the United States for the years 1999–2000, 2000–2001, and 2001–2002, our analysis suggests the following:

- There is a positive association between research publications and salary. This association holds even after controlling for factors such as sex, job duration, research ranking of the department, and rank of the professor.
- The results that disaggregate the Tier 1 marketing journals support differences among the journals in salary impact. Publication in *Marketing Science* (\$4,130.78) has the largest coefficient followed by *Journal of Marketing* (\$2,688.05), *Journal of Marketing Research* (\$1,907.87), and *Journal of Consumer Research* (\$1,583.27).
- In the aggregated model, the impact of publishing in Tier 1 marketing journals (\$2,176.25) is statistically similar to that of publishing in Tier 2 marketing journals (\$1,777.95). The impact of publishing in Tier 1 journals in marketing is significantly higher than in Tier 1 journals outside marketing (\$843.71).
- There is only directional support for gender differences: adjusting for research productivity and other factors, salaries for males are not significantly higher than females. There is, however, a statistically significant impact of academic rank: full professors earn higher salaries than associate or assistant professors. The research productivity ranking of a department is positively associated with salary.
- The impact of publication on salary does not show either increasing or decreasing marginal returns.

As expected, publishing in Tier 1 marketing journals has a positive impact on the salary of marketing faculty. Moreover, this impact is larger than that of publishing in nonmarketing journals or publishing in marketing journals that are not as highly ranked. Among the Tier 1 marketing journals, the relatively higher impact of *MS* on salary is interesting, especially because *MS* has always been perceived as a specialty journal (in the same way as *JCR*; c.f., Kamakura 2001) with a circulation that is much lower than mainstream journals such as *JM* (e.g., the circulation of *MS* is about 1,800 while that for *JM* is between three and four times larger). In addition, some impact and influence studies have found *MS* to rank the lowest of the four journals (e.g., Baumgartner and Pieters 2003). Similarly interesting is the fact that both *MS* and *JM* have a higher salary impact although they are—in many respects—maximally different across the journals examined. For example, while *JM* has the highest circulation, *MS* has the lowest, and publication in *MS* and *JM* are correlated very weakly ($r = 0.07$, $p < 0.05$ in Table 4). Also, while *JM* is more practitioner oriented, *MS* is oriented for a more technical audience. How then, is it that these two journals have the higher salary impact, with *MS* at least directionally higher than *JM*?

One explanation is based on labor economics. The first row of Table 5 shows the percentage of people who have never published in each of the Tier 1 marketing journals. While 52% of the professors in our sample have never published in *JM*, 46% have never published in *JMR*, and 63% have never published in *JCR*, *slightly over 80% have never published in MS*. We correlated the percentage of people who have never published in each journal with the salary coefficients from Table 7 and the association approached statistical significance ($r_{(df=2)} = 0.72$, $p = 0.11$, 2-tailed). Similarly, the percentage of professors who have published five or more articles in *JM* is 5.1%, *JMR* is 12.24%, *JCR* is 8.18%, and *MS* is 1.36%, roughly the reverse of the magnitude of the coefficients. Again, we correlated the percentages with the journal coefficients from Table 7 and the association is statistically significant ($r_{(df=2)} = -0.87$, $p < 0.05$, 2-tailed). This pattern of results is consistent with a labor market explanation.

It is also instructive to examine the journal influence estimates more closely. For example, in

Baumgartner and Pieters (2003), Table 1 for the 1996–1997 period (it includes data for all four of the journals we are interested in comparing), *MS* received the lowest raw number of citations (857) compared to *JCR* (4,119), *JMR* (4,461), and *JM* (6,043), thus suggesting on this measure that *MS* has the least impact in references (even though it has the greatest impact on salary in our study). Recall that although directionally greater, the coefficient for *MS* was not statistically different than that of *JM* or *JMR*. It could also be the case, however, that these journals are engaged in different levels of knowledge creation. To examine this possible explanation, we computed a *relative knowledge creation index* based on the data in Baumgartner and Pieters (2003). The knowledge creation index is computed by dividing the number of citations sent by the number of citations received. The knowledge creation indices are: *JM* ($1{,}470/6{,}043 = 0.24$), *JMR* ($1{,}292/4{,}461 = 0.29$), *JCR* ($598/4{,}119 = 0.15$), and *MS* ($379/857 = 0.44$). We then computed the correlation between the journal coefficient from the HLM estimation and this knowledge creation index. Their correlation was positive and significant ($r_{(\mathrm{df}=2)} = 0.89$, $p < 0.05$, 2-tailed). Thus, in addition to the labor market conditions, another explanation may be that the market values the journals differently based on their relative knowledge creation.

Even after controlling for publication record, we find that seniority pays (e.g., Hallock 1995). This result is contrary to the monopsonistic-discrimination model proposed by Ransom (1993). According to Ransom's model, senior faculty members are less mobile and as such may choose to not move despite receiving a lower salary. We find evidence of higher salary for full professors relative to associate and assistant professors after controlling for publication record. This result is consistent with the idea that faculty engage in a portfolio of activities (Shugan 2004a), and that different types of activities are rewarded at different career stages. So, for example, it is likely that senior faculty in marketing engage in (nonresearch) activities that are more highly rewarded later in their career (mentoring, service, corporate contacts, journal editorship, etc). However, only research that measures these faculty activities can determine the extent to which this explanation is supported by the data.

Many studies conducted in the 1960s and 1970s document strong differences based on the sex of the professor (e.g., Gordon et al. 1974, Johnson and Stafford 1974). As noted, our results are directionally consistent with these findings but are not statistically significant. More research is needed that explicitly models factors affecting the gender effects on salary.

In general, these results should be useful for several stakeholders. University administrators can use these results to develop research-productivity-based metrics for benchmarking their departments. Journal editors can use them to better gauge their journal's equity from the perspective of an important constituent that exerts financial control on our intellectual endeavors. Clearly, evaluations based solely on citations provide a unidimensional assessment of journal equity (Shugan 2002, 2004b, 2005). Research studies that simultaneously examine journals on multiple dimensions such as selectivity, citations, financial consequences, and readership among practitioners represent the next step. Although it may be hard to implement, individual researchers may use these results to examine their own allocation of time to nonresearch activities (e.g., consulting) that may reduce publication productivity. These results should also motivate younger researchers who may otherwise be hard pressed to see how research productivity benefits their career beyond simply gaining tenure. Because the impact of an article results in an addition to the base salary, it can be construed as an annuity, with a potentially large payoff over the lifetime of the scholar.

Limitations

Going forward, studies could incorporate teaching evaluations and service activities as antecedents of salary. We used the count of articles as a measure of the publication record to be consistent with Swidler and Goldreyer (1998). Other metrics such as citation counts could be investigated as well. However, in setting salary on a yearly basis, citation counts for a particular article are not known at the time the publication appears. Therefore, it is not possible for administrators to include quality indicators such as citation counts in assessing *current* productivity. More generally, metrics that comprehensively measure *productivity* and *quality* in a more unified, objective, and unbiased manner should be developed. Our results could also be refined by giving fractional credit for multiple-authored publications. The study could be extended to other populations, most notably (1) research-oriented private universities, (2) public and private universities with a teaching orientation, and (3) universities outside of the United States (e.g., Stermersch and Verhoef 2005). A comparative analysis of these populations should generate additional insights. Researchers should also consider the possibility that the faculty publishing in each journal may come from different populations, i.e., more highly paid faculty choose to publish in different outlets. Such reciprocal causal effects should be investigated in future research. Finally, nonmonetary rewards to publication can be substantial and should be included in future studies.

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Appendix. Cross-Sectional Regression Models for Nine-Month Salary (Tier 1 Marketing Journals Disaggregated)

Variables	All years	1999	2000	2001
Intercept	66,975.73***	62,501.56***	67,268.88***	71,059.71***
Marketing—Tier 1				
JM	2,302.32***	2,054.06***	2,336.71***	2,491.31***
JMR	1,765.02***	1,828.65***	1,647.66**	1,792.98***
JCR	1,250.35***	674.61*	1,141.36**	1,370.88*
MS	3,663.84***	2,654.78*	3,536.58**	4,042.16**
Marketing—Tier 2	1,278.21***	1,000.73*	1,078.72*	1,485.81*
Marketing—Tier 3	87.94***	53.90	94.02*	115.29*
Nonmarketing—Tier 1	1,148.47***	1,065.87**	1,108.55*	1,228.22*
Nonmarketing—Tier 2	−423.18	−115.85	−469.86	−603.91
Sex	2,194.54	2,462.58	2,158.56	2,691.77^
Acad. rank: Associate	3,724.54^	3,624.63	4,998.56	4,844.88
Acad. rank: Full	19,300.97***	19,446.99***	21,916.03***	20,625.74***
Information source	2,647.19^	1,672.25	3,129.58	3,919.24
Dept. research rank: Medium	8,641.06***	7,801.54**	7,781.20**	10,882.77**
Dept. research rank: High	15,707.64***	15,736.23***	15,205.67***	17,051.45***
R^2 (%)	53.37	59.7	55.37	54.28

Notes on variable coding. Academic rank: assistant professor is the base category; Sex: female coded 0, male coded 1.Information source: vita = 0, other source = 1; Dept. rank: department with lowest ranks are set as the base category.
$^{\wedge}p =< 0.10$; $^{*}p =< 0.05$; $^{**}p =< 0.01$; $^{***}p =< 0.001$.

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