Author Order Conditions and Co-authorship in Real Estate Journals

Kam C. Chan,* William G. Hardin III,** and Kartono Liano***

Abstract

This research links and extends studies in the business and economics disciplines on factors that affect author ordering and co-authorship in research papers to the real estate discipline. Author ordering measured by alphabetic ordering is associated with journal quality, the number of authors on a paper, the rank of the authors' institutional affiliations, and the authors' domiciles. Having a European co-author increases the likelihood of alphabetic author ordering. Within the real estate discipline, alphabetic author ordering becomes more common over time. Also, similar to the pattern from other disciplines, the percentage of co-authored real estate papers increases over the 17-year period investigated. Of the nine journals assessed, the three core business oriented academic real estate journals—Real Estate Economics, Journal of Real Estate Finance and Economics, *and* Journal of Real Estate Research—*have the highest percentage of co-authored papers, as would be expected from the top tier of academic journals.*

The assessment of research quality and productivity and the assignment of credit for individual research effort are topics that have received increasing attention in the literature. Research on author ordering and co-authorship is one area of investigation that has garnered much interest. While there is substantial interest in the topic simply from an applied, empirical basis associated with peer assessment, recent articles provide a theoretical foundation for the use of the alphabetic author ordering method and the increasing number of co-authored papers. To date, there has been little research on the two related topics in the real estate literature. The present paper is an extension of this area of research to the real estate discipline. We use a comprehensive database of articles published in nine major real estate journals during 1990–2006 to study the co-authorship patterns of real estate research. The period studied is substantial, as are the number of journals evaluated.

We find a statistically significant increasing trend in three, four, and multi-authored papers during 1990–2006. The increasing trend is not observed in two-authored and alphabetically-ordered articles. As has been the case in other disciplines, the real estate discipline has seen an increase in the team approach to research. As Barnett, Ault, and Kaserman (1988) imply in a study of co-authorship in economics, the increase in multi-authored papers is reflective of greater complexity in the research endeavor. Of the nine journals assessed, the three core business-oriented academic real estate journals—*Real Estate Economics*, *Journal of Real Estate Finance and Economics*,

*Western Kentucky University, Bowling Green, KY 42101 or Johnny.chan@wku.edu.
**Florida International University, Miami, FL 33199 or hardinw@fiu.edu.
***Mississippi State University, Mississippi State, MS 39762 or kliano@cobilan.msstate.edu.

and *Journal of Real Estate Research*—have the highest percentage of co-authored papers, as would be expected from the top tier of academic journals. Author ordering measured by alphabetic ordering is associated with journal quality, the number of authors on a paper, the rank of the authors' institutional affiliations, and the authors' domiciles. Having a European co-author increases the likelihood of alphabetic author ordering. Within the real estate discipline, alphabetic author ordering is common.

Literature Review

An early work by Barnett, Ault, and Kaserman (1988) assessing the increase in co-authored papers in the economics discipline implies that increased co-authorship is attributable to increasingly specialized skill sets, high opportunity costs, and the complexity of the research environment. In essence, it is more productive to use a team approach composed of members having complementary skills. Tompkins, Nathan, Hermanson, and Hermanson (1997) show that co-authorship is a common and valued practice in the finance discipline. Schinski, Kugler, and Wick (1998) show that lead authors get more than their equal share of credit for co-authored papers. This is partly attributable to the limited amount of research on the topic at the time of this work's publication. Subsequent papers investigate attribution of effort and author ordering and make no such link. Holder, Langrehr, and Schroder's (2000) survey of finance professors suggests that finance professors prefer the alphabetic author ordering methodology. They also show that professors at doctoral granting schools prefer the alphabetic author ordering methodology over the relative contribution methodology, which is preferred by authors at lower tiered schools. This difference may be attributable to the relative research expectations of these differing schools and the greater variability in research outcomes at non-doctoral granting institutions. Whereas most of the top research schools in any discipline require high levels of continuous research output, other schools with a larger teaching mission may be more likely to have research focused faculty along with teaching and service focused faculty.

In the economics discipline, Hudson (1996) and Sutter and Kocher (2004) show that co-authorship continues to increase. Acedo, Barroso, Casanueva, and Galán (2006) show a similar pattern in the management discipline. Butler (2007) looks at co-authorship in finance and insurance and shows that increased co-authorship is related to Internet accessibility and that Internet accessibility has also increased the number of new authors. It is easier to access the literature, assess data, and submit papers. Hilmer and Hilmer (2005) investigate research productivity, co-authorship, and pay for agricultural economists and find that publishing in higher quality journals and publishing single-author papers positively impact salary while being the lead author in non-alphabetic ordered papers is not associated with higher pay. At least in the field of agricultural economics, there is a salary premium for single authorship. Laband and Tollison (2006) examine co-author orders in a set of economics and agricultural economics journals. They find that alphabetized co-authored papers with two authors are more highly cited than non-alphabetized co-authored papers. The findings in Laband and Tollison suggest that alphabetically co-authored papers, on average, have higher quality. A higher citation count implies higher quality. In a recent

paper focused on the finance discipline, Brown, Chan, and Chen (2010) show that the use of the alphabetic author ordering methodology is related to publication in higher tiered journals, being affiliated with a research-oriented institution, and having fewer authors on a specific paper. When there are a large number of co-authors on a paper, the relative contribution of the marginal co-author may be less than other co-authors and this may be signaled by non-alphabetic ordering. Allen and Dare (2009), the only paper dealing with co-authorship in the real estate discipline to date,[1] use a small sample frame focused on the three top tier business real estate journals—*Real Estate Economics*, *Journal of Real Estate Research*, and *Journal of Real Estate Finance and Economics*—to study the probability of non-alphabetic co-authorship listing and the allocation of credit. Their assessment is that differences in the factors impacting the probability of non-alphabetic co-authorship listing will impact the evaluation of a specific co-author's contribution.

The interest in co-authorship issues also crosses other disciplines. With respect to medicine, Chambers, Boath, and Chambers (2001) study medical research articles and find that authors with last names at the beginning of the alphabet have an advantage for order of authorship when compared to authors with last names at the end of the alphabet. Simply, with regard to co-authorship listing, it is better to have a last name from the beginning of the alphabet. In information system research, Peffers and Hui (2003) actually find evidence of a decreasing trend in alphabetical author ordering, which is in contrast with the literature in other disciplines. In light of allocating co-author credits among co-authors, Holady and Yost (1995) offer a guideline for proper authorship credit in counseling.

While the literature primarily studies the co-author issue in terms of empirical analysis, there are several theoretical studies. These studies are of substantial value as they define an economic rationale for the use of alphabetical ordering by researchers. Engers, Gans, Grant, and King (1999) show that rational authors should support alphabetic author ordering and that bargaining between authors should generate such a method in an equilibrium state. When authors provide equal contributions to a work, the alphabetical ordering method should be preferred as it connotes equality while other methodologies provide ambiguity. With Engers, Gans, Grant, and King (1999) as reference, Joseph, Laband, and Patil (2005) link co-authorship, alphabetic author ordering, and journal quality. Under their basic assumption that higher quality research requires substantial input from all participants, researchers should gravitate to an alphabetic author ordering standard and the use of the alphabetic author ordering rule should be associated with higher quality research. Researchers that are active and working on many projects with other active researchers should prefer the use of alphabetic ordering, which implies complementary input among co-authors. The existing literature provides the framework for our empirical assessment of journals focused on real estate research.

Data and Results

Data on individual authors and institutions contributing to real estate research as measured by publications in nine academic real estate journals are collected for the

1990 to 2006 period. The nine journals evaluated are *Real Estate Economics*, *Journal of Real Estate Finance and Economics*, *Journal of Real Estate Research*, *Journal of Housing Economics*, *Journal of Regional Studies*, *Journal of Urban Economics*, *Land Economics*, *Regional Science and Urban Economics*, and *International Real Estate Review*. These are the same nine journals evaluated in Chan, Hardin, Liano, and Yu (2008). Similar to Chan, Hardin, Liano and Yu, comments, replies, conference discussions, and special editor introductions are excluded from the analysis.

The summary results presented in Exhibit 1 Panel A show patterns similar to those found by Brown, Chan, and Chen (2010) for the finance discipline and Brown, Chan, and Lai (2006) for the marketing discipline. Over the 17-year period from 1990 to 2006, the percentage of co-authored papers increases from 51.1% in 1990 to 72.6% in 2006, a more than 40% increase in co-authored papers. The percentage of papers that have two, three, or four or more authors increases over the period, with the greatest increase coming from papers that have three co-authors.

To examine the significance of the trend of co-authorship in real estate research, we conduct several simple regression analyses with a time trend as the explanatory variable and the percentages of two, three, four, multi-, and alphabetically-authored articles as the dependent variables. The results are in Exhibit 1 Panel B. The time trend variables are significant at the 1% level for three, four, and multi-authored regression equations, suggesting a statistically significant increasing trend of three, four, and multi-authored papers during 1990–2006. Specifically, for multi-authored articles, there is, on average, an increase of 0.91% per year during the period. Conversely, the two-authored articles and alphabetically-authored articles trend are not statistically significant. As has been the case in other disciplines, co-authorship is now normative in the real estate discipline.

This increase in the percentage of co-authored papers is supportive of Barnett, Ault, and Kaserman's (1988) initial conjecture that increased research complexity leads to more authors per paper. The results also point to the development of individual competitive advantages or skills where researchers will work with others having complementary skills. From a performance or tenure and promotion evaluation standpoint, one may infer a change in the requirement for single-authored papers to meet these hurdles, but this cannot be assessed with the present data. The percentage of papers using the alphabetic author ordering methodology does not appear to change over the period. As Allen and Dare (2009) point out, the use of non-alphabetic ordering may bias the allocation of research credit. If this is the case, then the relatively constant proportions of alphabetic and non-alphabetic ordered papers over time could indicate a systematic misallocation of credit by evaluators, such as administrators and promotion and tenure committees.

Exhibit 2 presents the percentage of multi-authored papers found in the nine leading real estate journals during 1990–2006 periods by journal. The *Journal of Housing Economics* and the *Journal of Urban Economics* have the lowest percentage of multi-authored papers during the period, with percentages of multi-authored papers of 50.5%

Exhibit 1
Trend of Multi-authored Papers in Nine Leading Real Estate Journals (1990–2006)

Year	Total Number of Articles	2-Authored Articles	3-Authored Articles	4 or More Authored Articles	Multi-Authored Articles	Alphabetical Ordered Articles Among All Academic Multi-authored Articles
Panel A: Descriptive data						
1990	235	35.3%	12.3%	3.4%	51.1%	61.7%
1991	254	46.5%	11.0%	1.2%	58.7%	69.1%
1992	245	33.5%	20.8%	2.0%	56.3%	67.4%
1993	242	42.6%	13.6%	1.2%	57.4%	79.9%
1994	254	46.1%	15.4%	2.8%	64.2%	66.9%
1995	265	46.0%	13.6%	2.3%	61.9%	68.3%
1996	263	39.9%	17.5%	4.2%	61.6%	74.7%
1997	280	30.7%	21.4%	4.6%	56.8%	71.7%
1998	283	38.5%	17.7%	6.4%	62.5%	72.9%
1999	281	41.6%	16.0%	3.9%	61.6%	71.7%
2000	268	39.2%	23.5%	4.1%	66.8%	69.3%
2001	264	38.3%	20.8%	4.9%	64.0%	66.9%
2002	269	40.1%	21.6%	4.8%	66.5%	69.8%
2003	268	40.7%	22.0%	4.9%	67.5%	72.4%
2004	271	36.5%	22.9%	4.1%	63.5%	75.0%
2005	274	39.4%	23.4%	6.6%	69.3%	67.9%
2006	274	41.2%	25.9%	5.5%	72.6%	65.3%
All years	4,490	39.8%	18.9%	4.0%	62.7%	70.1%
Panel B: Regression analysis						
Intercept		0.4047 (18.06)***	0.1210 (9.35)***	0.0172 (3.18)***	0.5431 (37.76)***	0.6950 (31.21)***
Time trend (from 1 to 17)		−0.0008 (−0.35)	0.0074 (5.88)***	0.0025 (4.68)***	0.0091 (6.47)***	0.0006 (0.28)
R^2		0.0083	0.6981	0.5940	0.7363	0.0053
F		0.1256	34.6793***	21.9460***	1.8799***	0.0801

Note: Panel A presents the trend of co-authorship and the ordering of authors in nine leading real estate journals during the 1990–2006 period. Panel B presents the results of a time trend analysis using year as the explanatory variable (1990 as 1, 1991 as 2, ... 2006 as 17) and the yearly percentage of coauthored articles as dependent variables. *t*-statistics are in parentheses. $N = 17$. ***Indicates significance at the 1% level.

Exhibit 2
Author Ordering Patterns in Real Estate Journals (1990–2006)

Journals	Number of Papers Published	2-Authored Articles	3-Authored Articles	4 or More Authored Articles	Multi-Authored Articles	Alphabetical Ordered Articles Among All Academic Multi-authored Articles
International Real Estate Review	73	37.0%	26.0%	6.8%	69.9%	66.7%
Journal of Housing Economics	273	33.7%	13.2%	3.7%	50.5%	76.8%
Journal of Real Estate Finance and Economics	569	44.8%	26.5%	4.0%	75.4%	76.0%
Journal of Real Estate Research	583	38.6%	26.2%	4.6%	69.5%	63.0%
Journal of Regional Science	497	39.6%	16.3%	3.2%	59.2%	62.2%
Journal of Urban Economics	806	40.3%	12.3%	1.4%	54.0%	80.9%
Land Economics	652	37.6%	17.3%	7.7%	62.6%	49.3%
Real Estate Economics	454	37.7%	29.1%	5.1%	71.8%	74.8%
Regional Science and Urban Economics	583	42.5%	11.1%	2.4%	56.1%	82.6%
Total	4,490	39.8%	18.9%	4.0%	62.7%	70.1%

Notes: This table presents the percentage of multi-authored papers for nine leading real estate journals during 1990–2006. The last column shows the percentage of papers with names listed in alphabetical order (authors from non-academic institutions are excluded). The results suggest that different journals have different co-authoring order patterns.

and 54.0%, respectively. The *Journal of Real Estate Finance and Economics* and *Real Estate Economics* have the highest percentages of papers with multi-authors, with percentages of multi-authored papers of 75.4% and 71.8%, respectively. Furthermore, *Regional Science and Urban Economics* and the *Journal of Urban Economics* have the highest percentages of alphabetical ordered papers, with percentages of 82.6% and 80.9%, respectively. In comparison, *Land Economics* and the *Journal of Regional Science* have the lowest percentages of alphabetical ordered papers, with percentages of 49.3% and 62.2%, respectively. A chi-square test using this data indicates that the number of co-authors on a paper partially determines the use of the alphabetic author ordering methodology. Papers with three or more authors are less likely to use the alphabetic author ordering methodology than papers with only two authors.

We also examine whether alphabetic author ordering is related to the general academic level of authors. Following Brown, Chan, and Chen (2010), academic institutions are placed in one of five different levels based on their total weighted number of articles during the period 1990–2006. The weighted number of articles measure is based on author and affiliation. Each author's institution receives $1/N$ credit, where N is the number of co-authors on a paper, for each article published. Level 5 represents the academic institutions in the top quintile; level 4 represents academic institutions in the second quintile, with other levels being representative of an institution's lower quintile ranking. Non-academic co-author affiliations are not evaluated, although articles that include both academic and non-academic authors are included in the analysis. Among the 2,864 multi-authored articles, there are 2,813 articles having at least one academic author. In cases where some of the co-authors are from non-academic institutions, the average rank of all academic co-authors is used.

Results of a logit model of the use of the alphabetic author ordering rule are presented in Exhibit 3. The use of the alphabetic author ordering methodology is positively associated with being published in one of the core business real estate journals. The coefficient on the core business real estate journal variable is statistically significant at the 1% level. The coefficient on the year term is insignificant, suggesting that the probability of using the alphabetic author ordering has been unchanged from 1990 to 2006 as has already been noted. The use of the alphabetic author ordering rule is negatively associated with the number of authors on a paper. Papers with more authors are less likely to use the alphabetic author ordering methodology than papers with fewer authors. The coefficient on the number of authors variable is negative and statistically significant at the 1% level. This is a likely result when authors come from differing schools and when an author might be perceived as the leader of a research project with a large number of co-researchers. When the number of authors gets higher, the need to manage the research process increases. The research ranking of an author's institutional affiliation impacts the use of the alphabetic author ordering methodology. Papers with authors from the higher quintiles, or ranks, of research institutions within the real estate discipline are more likely to have authors ordered alphabetically. This variable is positive and statistically significant at the 1% level. In addition, having an author domiciled at a European institution is a predictor of the use of the alphabetic author ordering methodology at the 1% level of statistical

Exhibit 3
A Logit Model of Author Ordering in Real Estate Publications

	Expected Sign	Estimated Coefficient	Chi-square Statistics
Intercept		2.5779	136.678***
Core journal dummy variable (JRER, JREFE, and REE = 1; all others = 0)	+	0.2654	8.604***
Year trend (1990 = 1; ... 2005 = 17)	+	0.0112	1.453
Number of co-authors	−	−0.9701	195.376***
Average ranking of all coauthors' academic institutions (1 to 5 with 5 as the highest ranked)	+	0.1252	10.841***
Asia-Pacific dummy variable (at least one co-author is from an Asia-Pacific institution = 1; all others = 0)	+/−	−0.0368	0.065
European dummy variable (at least one co-author is from an European institution = 1; all others = 0)	+/−	0.5828	19.733***
Log likelihood function value		3,433.50	
Likelihood ratio test for all coefficients are joint zero (Chi-square statistics)		232.02***	
Model successful classification rate		67.0%	

Notes: The dependent variable is co-author ordering (alphabetical order =1; non-alphabetical order =0) and the probability modeled is alphabetical order is 1. The results suggest that: (1) higher quality articles (published in the top three business real estate journals) are inclined to be alphabetically ordered among co-authors; a result consistent with the literature; (2) as the number of co-authors increase, the probability of alphabetically ordered articles is less likely; again consistent with existing theory; (3) articles written by higher ranked co-authors are more likely to be alphabetically ordered and (4) European co-authors are more likely to be alphabetically ordered, which is consistent with the finding in the literature. The number of observations is 2,813.
*** Indicates significance at the 1% level.

significance, while their counterparts at Asia-Pacific institutions tend to shy from using the alphabetic author ordering.

The analysis of the data indicates that the use of the alphabetic ordering methodology or rule is positively associated with journal quality and the research ranking of the authors' institutional affiliations. The use of the alphabetic ordering methodology is negatively related to the number of authors on a paper. Having a European co-author increases the likelihood of alphabetic author ordering. The results are comparable to findings in the finance, economics and marketing literatures. The increase in co-authored papers in the real estate discipline is also similar to what has been found in other disciplines. As the quality of research has improved and the skill sets needed

for publication have expanded, the use of co-authors with complimentary skills has increased.

Conclusion

Investigation of co-authoring trends adds to the literature on research productivity and quality in business and economics. While some academics like to think of lead researchers or principle investigators, such delineation is not the primary characteristic found in business and economics research. The research complexity in the business disciplines makes it more likely that researchers with complementary skills will work together to generate high quality research. Specifically, in the case of real estate research, the pattern found in the finance discipline, where the percentage of co-authored papers has increased over time, is confirmed. The number of single-authored papers declines from 48.9% in 1990 to 27.4% in 2006. A direct implication from a performance assessment standpoint is that a requirement for researchers to publish single-author papers to signal quality and/or expertise is no longer the definitive norm.

With regard to the author ordering analysis, alphabetic ordering is associated with journal quality, the number of authors on a paper, the rank of the authors' institutional affiliations, and the authors' domiciles. The core business real estate journals are more likely to evidence alphabetic ordering when compared to the top tier of non-business real estate journals. While it has been argued that this is a signal of quality, in the present case, this could simply be related to the disciplines that typically support the various journals used in this study. For example, alphabetic ordering is normative in the finance discipline. As the number of authors on a paper increases, especially with four or more authors, there is less use of alphabetic ordering. When there are large numbers of researchers on a project, delineation of contribution is more pronounced, especially on a marginal basis and would generally be expected in such situations. Authors located at universities ranked higher in discipline specific research are more likely to use alphabetic ordering. In situations where co-authors work in institutions having high research expectations, the use of alphabetic ordering aids in creating an environment that supports the use of complementary skills. Finally, the data indicate being domiciled in Europe is positively associated with author ordering.

To discern the relative contribution of a single author publishing in the top tier of real estate and urban economics journals, recognition of the influences associated with author ordering is required. For example, when author order is alphabetic, there is a strong signal that the relative contributions of each co-author are equivalent. Without alphabetic ordering, the situation is more ambiguous, as has been noted by Allen and Dare (2009). When there are four or more co-authors and there is non-alphabetic ordering, the plausible assessment is that the first author should be granted relatively greater attribution. The use of the designation of lead authorship as a measure of productivity then needs to be understood in the context of the author ordering that is typically done in the highest tier of journal.

Endnote

1. Urbancic (2007), in an analysis of the first two decades of articles published in *Journal of Real Estate Research*, provides a partial assessment of author ordering of the papers, but does not address the concept on a discipline level.

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