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Endogenous selection into single and coauthorships by surname initials in economics and management*

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Many prior studies suggest that alphabetic ordering confers professional advantages on authors with earlier surname initials. However, these studies assume that authors select into coauthorships without regard to the incentives identified. We consider the alternative and develop a model of endogenous selection into single and coauthorships for economics, which uses alphabetical ordering. We then tested it with authorship data from economics, with management (which does not use alphabetical ordering) as a benchmark. We predicted that lower “quality” authors with earlier surnames would be less desirable as coauthors, while higher quality authors with later surnames would have a lower desire to coauthor. Both types of authors are therefore more likely to single-author. Furthermore, higher quality authors with earlier surnames should have more and better coauthoring options. Consistent with our predictions, we found citation ranks were increasing on surnames for single-authored works and decreasing for coauthored in economics, both absolutely and compared to management. Also as predicted, this effect is driven by lower-tier journals in which there is likely a thinner market for coauthors. Furthermore, comparing citation ranks of first-authors of alphabetical and nonalphabetical papers shows that the “larger share” effect of being first is dominated by the “smaller pie” effect of selection from second authors who will accept a smaller share.

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I. Introduction

Coauthoring is increasingly prevalent in many of the sciences, including economics (Hudson, 1996; Torgler & Piatti, 2013), marketing (Brown, Chan, & Lai, 2006), and finance (Brown, Chan, & Chen, 2011). This trend could be due to a number of reasons. Authors could be exploiting the gains from specialization within increasingly specialized fields, hedging against the risks of rejection or delayed review, and/or changing the tradeoff between quantity and quality (Hudson, 1996) (see Bruno (2014) for a recent review of theories of coauthorship). Such collaboration is also facilitated by today's decreased communication (transaction) costs resulting from the greater ease of travel and the use of electronic correspondence and research methods.

One important aspect of coauthoring is the order in which contributor names are listed on title pages and elsewhere, which usually follows one of two conventions: alphabetically by surname or by relative contributions. Economics is among the fields that uses alphabetical ordering. 86 percent of coauthored papers in economics journals for five major journals for the last two decades listed authors alphabetically (Engers, Gans, Grant, & King, 1999), as did also 92 percent of the top-three finance journals (Brown et al., 2011). In contrast, only 30 percent of papers published in the major biological journals use alphabetical listings. See Waltman (2012) for a ranking by alphabetization of 25 subject categories in the mathematical, social and hard sciences, as well as the humanities.

This difference in citation convention has important consequences for both researchers and research. In terms of recognition, being first-author tends to increase salience and attributions of credit (Nudelman & Landers, 1972) because it has been long standing practice for citation indices to include only the names of the first-author, and because papers with three or more authors are often shortened with the first-author et al. rule (Van Praag & Van Praag, 2008). Perhaps as a consequence, papers whose first-authors have surnames beginning with a letter coming early in the alphabet (hereafter, early initial authors) receive more citations (Huang, 2015). In economics, for instance, authors whose surnames begin with A are significantly more likely to have their abstracts viewed and downloaded than authors whose surnames begins with Z (Efthyvoulou, 2008).

Being listed as first-author would then also have financial repercussions; there is little disagreement that more citations lead to higher pay (Hamermesh, Johnson, & Weisbrod, 1982; Hilmer, Hilmer, & Ransom, 2012; Moore, Newman, & Turnbull, 2001; Sauer, 1988). More

important, and perhaps as a result of the advantages mentioned above, early initial authors are promoted more quickly. For example, in the top-10 U.S. departments in economics, early initial authors receive more rapid promotions and have a greater likelihood of tenure, as well as of such honors as fellowship in the Econometric Society, the Clark Medal, and even the Nobel Prize (Einav & Yariv, 2006). Efthyvoulou (2008) confirms this higher rate of promotions in a larger sample of highly ranked research departments in the U.S. and UK. In psychology, on the other hand, in which authors are listed by relative contribution; surnames have no effect on promotions (Einav & Yariv, 2006).

The literature also offers evidence that authors may react to these incentives. For example, Efthyvoulou (2008) demonstrates that authors manipulate their names in order to gain precedence, using prefixes like “De” and suppressing prefixes like “Van.” Likewise, Torgler and Piatti (2013), in their analysis of publications in the *American Economic Review* (a top-3 journal), identify a strong negative relationship between the number of coauthors and the probability of alphabetical name ordering, which may reflect the involved authors concern for visibility. Such awareness may also be indicated by van Praag and van Praag’s (2008) finding that higher inequality of author reputations increase the probability of nonalphabetical ordering, while higher coauthor reputations lowers that probability. Ordering by surname has been found to affect endogenous selection into coauthorships. For instance, Einav and Yariv (2006) find that although the relative frequency of author surnames in single-authored, two authored, and three authored papers do not differ significantly, later initial authors are significantly less likely to participate in four- and five-author projects.

In summary, the prior empirical literature seems to have largely established that the alphabetic ordering convention confers disproportional professional advantages to authors with earlier surname initials. This literature has generally assumed that authors do not endogenously select into coauthorships by the alphabetical incentives identified, and in the case where it has, not by author “quality” as measured by citation rank. We address this omission by considering the possibility that researchers coauthor or single-author based upon the expected or actual contributions of potential coauthors and their own share of the total credit, based upon surname initial position in the alphabet.

We assume the main result of this literature; that in the context of a default alphabetical ordering, second authors lose credit share to the first-author for the quality of the paper.

However, we also note that apart from the reasonable presumption of competitive outside options to any particular coauthoring opportunity, all authors have a fixed single-author outside option that is only a function of their own quality. Hence, for the second-author to have accepted less credit for the quality of the paper, the first-author with the earlier surnames will have tended to contribute more to compensate the second-author for the lost credit⁵. We also assume, in line with the previous literature (Engers et al., 1999), that observers can be more certain that the first-author contributed more for nonalphabetically than for alphabetically ordered papers. Combining this with the fixed opportunity cost for single-authoring and/or a competitive market for coauthors, we predict a larger gap between the contribution of the first and second-author for nonalphabetically than alphabetically ordered papers. By using a simple two coauthors example, we show that nonalphabetical ordering combined with the belief that this signals a greater discrepancy in the contributions of first and second-authors will break the symmetry between alphabetical and nonalphabetically authored papers for authors with earlier or later surname initials. This will result in the following incentives:

- a) Early initial lower quality authors will be less preferred as coauthors.
- b) Later initial higher quality authors will have a weaker preference to coauthor.
- c) Early initial authors of the highest quality will have more options for potential coauthors than later initial authors of the highest quality.

Based on (a) and (b), we predict that i) author quality in coauthored papers should decrease with alphabetic position of author surname initial; ii) author quality in single-authored papers should increase with the position of the author surname initial; and iii) because of author abstention from coauthorship, economics should have a relatively lower frequency of coauthored works than comparable fields like management that have no alphabetic convention. As a consequence of (c), iv) this effect of fewer options should be stronger among lower-tier journals that draw from authors who are likely to face a thinner coauthor market. Furthermore, this selection effect should be exacerbated for authors of articles that are ordered nonalphabetically, as it more clearly indicates unequal contributions. Comparing citation ranks of first-authors of alphabetical and nonalphabetical papers will also let us determine the relative strengths of the

⁵ Such matches could just be more stable.

“larger share” effect of being the first-author and the “smaller pie” effect of adverse selection for second-authors who will accept a smaller share.

We test these predictions for single and coauthored papers using 1900–2000 records from the top-23 economics journals. To address the identification problems engendered by self-citation and the unknown and/or nonstationary distribution of non-Western names, we also use the single and coauthor management citations from the top-30 management journals as a benchmark (see Appendix Table A.I for the full list) to test for citation differences between single and coauthored papers in economics. In this respect, we also make a methodological contribution. Further robustness checks after discussed after the main results.

Besides motivating a reevaluation of prior results, our findings also have implications for endogenous teams with asymmetric surplus (Wuchty, Jones, & Uzzi, 2007). Our results suggest that aside from intrinsic motivations, one of the many possible motivations for scholarship could be contest incentives recently surveyed in Dechenaux, Kovenock, and Sheremeta (2015).

Theories of Coauthorship Conventions

According to Laband and Tollison (2000), alphabetization is a form of pay compression that encourages collaboration of the form seen in industrial settings (Lazear & Oyer, 2007). Brown et al. (2011) on the other hand, explain that the correlation between higher quality and alphabetization is due to the greater difficulty of determining the relative contributions of authors for a higher quality publication, or because authors are less worried about getting credit proportional to their effort for such publications. Alternatively, it may be because the authors are more likely to be prominent, and therefore, have lower marginal gains from being first.

To our knowledge, there is only one formal theoretical paper about surname order. Engers et al.’s (1999) model of effort in coauthorships proves that it is never an equilibrium for authors to always be listed in the order of relative contributions. This is a consequence of the market drawing stronger inferences about relative contributions of authors when the authors are in nonalphabetical order. Engers et al.’s (1999) show that this asymmetry causes the second-author to lose more credit than the first-author gains when they appear in nonalphabetical order. They demonstrate that alphabetical ordering is inefficient and that higher effort will be elicited from authors if the relative contribution convention were adopted. Hence, this theory predicts that the quality of authors should be *decreasing* on alphabetization.

However, Brown, Chan and Lai (2006) find that quality, as measured by citations in 19 leading marketing journals, is positively correlated with alphabetic ordering. Joseph, Laband and Patil (2005) employ simulations of authors with stochastic quality realizations to demonstrate that the rate of alphabetization increases with the publication hurdle. This is due to the fact that both authors must be of higher quality to publish in top journals, and that one was of a significantly lower quality than the other if the surname order was nonalphabetical.

A crucial assumption of Engers et al.'s (1999) theory and an implicit assumption of the empirical papers in the literature is that authors are of homogenous quality and have no option to single-author. To our knowledge, no paper has yet addressed selection into single and coauthored papers by surname and heterogeneity in author quality.

II. An Illustrative Model: The Coauthor Game

Like standard bargaining games, the bargaining positions of players here in this “coauthor game” are functions of their outside options. However, in this case, these are determined by both their quality and surname types, when they coauthor, but only by their quality, when they single-author. To illustrate, suppose that nature draws two authors from a set of three whose surnames begin with different letters {A, B, C} and who, based on expected citations, meet three standards of quality $H > M > L$ that are fixed at the moment of choice. These capture both the expected contribution to coauthored papers and the opportunity cost for coauthored papers.

Table I summarizes the incentive-compatible potential matches if, given competition or the fixed opportunity costs of single-authoring, the first-authors are of weakly higher quality than the second-authors. The single-author option is available to everyone equally and is fixed by their quality, so we omit these. However, these should always be kept in mind as outside options.

[Insert Table I here]

Table I shows that among the alphabetical pairs, for every quality level of first-authors, the number of incentive compatible second-authors is decreasing in quantity, fixing the quality of the second-authors. A_H s have six options, twice as many as the B_H s, fixing quality. A_M s, in turn,

have twice as many as the B_{MS} , fixing quality. Cs have no incentive-compatible options among alphabetical authors.

The loss of second-author options for each quality of first-authors among alphabetical pairings as initials increase would be compensated among the nonalphabetical pairings if there was no extra penalty for nonalphabetical ordering. However, by the assumption of the literature (Engers et al., 1999), observers rule out ties in author contributions, when they observe nonalphabetical ordering, in the context of a default alphabetical ordering rule; they assign first-authors strictly more credit when nonalphabetically ordered. Since the options of coauthoring in alphabetical or nonalphabetical pairs and single-authoring are substitutes, the fact that the total set of options are diminishing in quantity and quality for each quality of the first-author for coauthored pairings, while constant in the single-authoring realm, would predict that citation rank should be increasing on surname initials for single-authored papers. The number of options is smaller among the nonalphabetical compared with the alphabetical pairings, which would be consistent with a generally lower average citation rank for nonalphabetical pairings as compared to alphabetical.

Based on the results of this coauthor game, we make the following six predictions for our empirical tests with the economics literature, which uses the alphabetical convention, as compared to the management literature, which does not.

Predictions:

- P1. Citations of authors of coauthored papers in economics will decrease with surname letter increment relative to papers in management (and perhaps also absolutely).
- P2. Citations of authors of single-authored papers in economics will increase with surname letter increment relative to papers in management.
- P3. The effects predicted in P1 and P2 will be stronger for lower quality journals.
- P4. Economics will have a higher probability of single-authorship than management.
- P5. Early initial authors will have more and higher quality coauthored works and will be promoted more quickly (as already shown in the literature and discussed beforehand.)
- P6. The citation rank of papers with nonalphabetically ordered authors will be lower than those of alphabetically ordered.

III. Results

We now test our theoretical predictions P1–P4 and P6 using the citations from year 1900 to 2000 obtained from Thomson Reuters Web of Science⁶ for the top-23 journals in economics (accessed November 7, 2012) and the top-30 journals in management (accessed March 7, 2013). These citation records encompass 43,013 economics and 52,765 management publications, 35 percent (15,110) and 43 percent (22,871) of which, respectively, are co-authored. Of these, 83.41 percent in economics and 47.82 percent in management are alphabetically ordered. We exclude any post-publication activities (e.g., replies, corrections), conference papers, and book reviews. Information on articles from economics and finance and management journals are recorded (if available) up until December 2011 and December 2012, respectively.

[Insert Table II here]

Table II lists a breakdown by the number of authors in each field.

Because raw citations follow a power law distribution (Gupta, Campanha, & Pesce, 2005; Redner, 2005), with frequently cited papers often driving estimates even when they are few, we follow Huang (2015) in using citation rank rather than citation. Hence, for each publication year, we define a paper's citation rank as c times 10 years citations:

$$\text{Citation rank} = \frac{N_{\text{citation} < c} + 1}{N_{\text{total}}} \times 100,$$

where $N_{\text{citation} < c}$ is the number of papers with fewer citations than c , and N_{total} is the total number of papers (in both economics and management) published in the same year. This measure ranges from almost zero to 100 and, for any particular paper, can be understood as the proportion of articles published in the same year that have fewer citations (in terms of percentages):

⁶ See <http://wokinfo.com/>.

$$Citation\ rank_{aij} = \beta_0 + \beta_1 Econ + \beta_2 Initial_a + \beta_3 Initial_a * Econ + \theta X_{aij} + \gamma Z_{jt} + \varepsilon$$

Eq.(1)

$Citation\ rank_{aij}$ is for author a who published article i in year j . $Econ$ is a dummy variable and equals to 1 if the paper is from economics. $Initial_a$ is a number from 1 to 26 representing the surname initial (from A to Z) of author a . X_{aij} are control variables for authors and papers, including *Academic age* (years since first publication), *Lifetime citations* (total 10 years of citations of all papers of the author) and *Pages* (pages of the paper). Z_{jt} include year dummies and their interaction with $Econ$ dummy, to capture heterogeneous time trend for two disciplines.

In words, Eq. (1) models the average impact of the field and rank of the authors' surname initial and other characteristics on citation rank. It should be noted here that although citations enter explicitly on the left side of the Eq. (1) and implicitly on the right side as the basis of coauthor choice, we assume that when making this decision, researchers take their own and their potential coauthors' past citations (and thus, estimated abilities) as fixed.

[Insert Table II here]

Figure I illustrates the average citations for authors of single-and two-author works in both management and economics. Whereas the citations of single-authored papers in management nearly parallel those for coauthored works, the citations for coauthored papers in economics decrease both absolutely and with respect to the trend in management. The citations for single-authored papers in economics, however, increase both absolutely and with respect to the trend for coauthored papers in management. As Table III–V will show, all these trends in economics are significant.

[Insert Figure I here]

Table III reports the results of regressing the average ranking of single-authored papers with authors grouped by the first letter of the surname for the top-23 economics journals using the top-30 management journals as a benchmark. This average ranking of papers can thus be understood as the average ranking of each letter group of authors. Whereas A authors of single-

authored management papers (in column (1)) rank on average at the 30.184 percentile among all management and economics articles, A authors of single-authored economics papers rank 10.148 percentage points higher. In particular, the insignificant coefficient of *Initials* -0.043 suggests that the ranking of management authors is not affected by their surnames. The ranking of the economics authors, in contrast, increases by 0.125 percent for every increment in a surname's alphabetic positioning, with respect to the management benchmark. Thus, for every 1000 economists of single-authored papers, one economist is “misranked”⁷ with respect to economists whose surname begins with an initial that is one letter earlier. For those whose surnames begin with Z, this “misranking” grows to $0.125 \times 25 \times 1000 = 31.25$ with respect to A authors. In Columns (2) and (3), we further control for *Academic age* (years since first publication), *Pages* and *Lifetime citations* (total 10 years of citations of all the author's papers).

[Insert Table III here]

We restrict the sample to later than 1960 (columns (4)-(6)) when the rate of single-authorships start to decrease dramatically (see Appendix Figure A.I and Figure A.II). *Initials*econ* is still positive and significant as predicted, both absolutely and compared to management benchmark. *Initials* becomes significant, which seems to be consistent with previous findings that earlier surname authors have more citations (Huang, 2015).

Table IV lists the results of the comparable regression for coauthored papers. Here, among all management and economics paper citations, A authors of two-author articles rank at the 50.002 percentile for management papers but 7.186 percentage points higher for economics papers. However, this becomes negative after we include more controls. The main contributing factor to the change in sign seems to be page length, the coefficient of which is around 2.5. However, economics papers are on average five pages longer than management. We attribute the difference to different citation conventions across fields; management papers may have more citations per paper.

⁷ We use quotations because this ranking is at least partly the result of endogenous selection.

Interestingly, *Initials* now shows an increasing trend in management, which seems to contradict the trend identified by Huang (2015). However, he also used fields with both alphabetical (mathematics and physics: Waltman (2012)) and contributions ordering conventions (information computer technology: Waltman (2012); biology: Zuckerman (1968)). We do not have information on the convention used in the other seven fields included in his data set. In any case, the trend becomes insignificant once we add more controls in Column (2) and (3). For coauthors in economics, the first letter of the surname has the opposite effect; economists' ranks decrease by a significant -0.134 percentage points with every positional increment of the surname, compared to the management benchmark. Thus, for every 1000 economists with coauthored papers, one economist is "misranked" with respect to economists whose surname begins with one letter immediately preceding in the alphabet. Such "misranking" grows to $-0.134 * 25 * 1000 = -33.35$ for Z authors with respect to A authors.

[Insert Table IV here]

We predict in P1–P2 that the trends for the alphabetic positioning of surnames on single and coauthored papers in economics will be opposing to each other and distinct from those the corresponding management benchmarks. The regressions reported in Table III and Table IV do indeed show that both trends are significantly different from zero and moving in the predicted directions. A direct comparison of these two trends, provided by the coefficient of *Initials*econ*single* in Table V, shows them to be significantly different; the magnitudes of the coefficients offer evidence consistent with opposing directionality. Moreover, the significance of our findings is unchanged when we restrict the sample to 1960 onwards.

[Insert Table V here]

We found no significant result for three-authored and four-authored papers for either economics or management. That could be due to the increasing marginal cost of coordinating more authors and what we would expect are the smaller marginal gains for each extra person. We suggest that a third- or fourth- author is invited to join when the paper with two or three authors, respectively, ran into problems. In that case, the credit by surname order may be less

important than getting the best author. Alphabetical ordering could also be less indicative of contribution levels, if it is well understood that the negotiations costs necessary for a full ordering of authors by contributions become exorbitant as the number of authors increases (Zuckerman, 1968).

According to Table VI, the effect of surname initial on ranking for single-authored papers is driven by the bottom-five journals in economics, a pattern mirrored by the effect of surnames on ranking for two-authored economics papers. This finding is consistent with our P3 prediction that the effect of endogenous selection should be stronger for lower-tier journals, whose market for coauthors is likely to be thinner.

[Insert Table VI here]

The outcomes related to the P6 prediction are reported in Table VII, which shows that nonalphabetically listed author names in two author works have a significantly lower citation rank (-7.071 percentage points for column (1)), but an insignificantly lower trend on surname initial (-0.061) than the alphabetical benchmark.

[Insert Table VII here]

Our findings in Table VII suggest that while people with later surname initials should still suffer from having fewer collaborators as predicted by Table I, they suffer even more when their collaborators must in equilibrium be of lower quality to tolerate losing even more credit to a first-author with a later surname. First-authors of papers in nonalphabetical order get a larger share of a smaller pie. We show that the smaller pie effect dominates the larger share effect.

Lastly, in Figure II, we illustrate the possible consequences of the diminished incentive to coauthor in economics; namely, a 5 percent higher probability of single-authorships than in management across all surnames (the gap is significant at 5 percent level for 19 out of 26

initials). This gap, however, is merely suggestive of the welfare loss to authors because management could be subject to other differences in incentives to coauthor⁸.

[Insert Figure II here]

IV. Robustness Checks

To further verify our results, we reran our baseline regressions for single- and two-authored papers in both economics and management without using the management papers as a benchmark. Table VIII shows that the positive trend for single-authored economics papers is still positive (0.082) and the negative trend for coauthored papers is still negative (-0.070). For single-authored papers in management, the trend is still insignificant at (-0.043). As noted in the discussion of Table IV, the positive trend for management coauthored papers (0.064) becomes insignificant with more controls.

[Insert Table VIII here]

In Table III–VIII, the citation ranks are computed for economic and management papers together using pooled rankings. To control for possible differences in citation style between the two fields, we also reran regressions for economic and management papers using within-field rankings, as well as regressions with only the first-author of each paper. These results are identical in significance, although the coefficients are slightly different. These are available on request.

V. Discussion

To sum up, we have confirmed the prediction of a positive citation rank trend on author initials for single-authored economics papers when compared with management single-authored papers, alone and as compared to economics coauthored papers. We have also confirmed the negative

⁸The gap increases to 10 percent if we include coauthored papers with more than two authors, and that 10 percent gap is significant at the 5 percent significance level for 24 out of 26 initials. See Figure A.III in the Appendix.

citation rank trend on author initials for coauthored economics papers, again, as compared to management coauthored and alone. We have furthermore shown that these trends are stronger for lower-tier journals. Thus, we provide evidence that some economists deliberately or unconsciously take into account both the likely contribution of their coauthors and their own share of the credit as a function of their respective surnames when they decide to form or to dissolve a coauthorship. Furthermore, the fact that the smaller pie effect dominated the larger share effect suggests that being on a better team in economics, and generating more credit, matters more than having greater share of the credit.

Our findings suggest an alternative explanation to the stylized fact that has already been established by prior work; that first-authors get a disproportional share of the credit for the quality of papers. We show that this disproportionate share of the credit could be anticipated in the formation or the dissolution of the coauthorship, and thereby, not necessarily undeserved. Together with Ductor's (2013) finding that coauthored works engender more citations than single-authored papers, our theoretical prediction P5 suggests an alternative explanation for the findings of Einav and Yariv (2006) that promotions, prizes, and higher pay are more likely to be accrued to people with earlier surnames in economics, or other fields in which alphabetical ordering is used. In addition, not only would P5 have predicted the high correlation in 20 social science fields between alphabetical ordering of author names and the proportion of first-authors with early initial surnames (Levitt & Thelwall, 2013) but also the higher citation rate of alphabetized versus nonalphabetized two author articles in both economics (Joseph et al., 2005) and agricultural economics (Laband & Tollison, 2006). It would also have predicted Brown et al.'s (2006) finding that the rate of coauthorships with alphabetical ordering is stronger for the top-four marketing journals in their sample than for the other 19.

Our findings may even help resolve the still controversial question of whether coauthoring is more conducive to higher quality scholarship. For example, Laband and Tollison (2000) find that coauthored papers are more likely to be accepted than single-author papers, while Wuchty et al. (2007) and Chung, Cox, and Kim (2009) show that, once citations are discounted by the number of coauthors, coauthored papers are more cited. On the other hand, Medoff (2003) identifies no such increase in citations, and Hollis (2001) even reports lower citation counts for coauthored papers. In more recent work, Ductor (2013) shows that once common research interests (being a form of endogeneity in coauthor selection) are controlled for coauthored papers are in fact more

cited (see his paper for a review of the evidence for greater productivity in coauthorship). These conflicting findings, however, could result from actual differences in the quality of papers arising from endogenous selection into single or coauthorships in fields with alphabetical versus contribution ordering, and with varying numbers of coauthors.

Our findings do raise several interesting avenues for further research, including whether some part of the aggregate citations of academic institutions, countries, or ethnicities can be predicted by the order of the contributing authors' surnames. For instance, Freeman and Huang (2015) demonstrate that ethnicity can affect citations through the distribution of surnames. China's 1.4 billion people have only 4000 surnames. This is three percent of the 150,000 surnames of the 300 million people in the US⁹. Furthermore, one third of China's surnames are from the last four letters of the alphabet (Wang to Zou¹⁰). Universities in countries like China may foresee greater returns from fields like management rather than fields like economics, if the surnames of faculty tend to be from the end of the alphabet.

Our findings have been about selection into coauthorships. However, they could also apply to selection into institutions if the potential for coauthorships is an important reason for joining an institution. For example, a junior candidate with a last name of Johnson, who has yet to prove his or her ability, might lean towards a department with a greater share of established researchers having surnames like Arrow or Becker rather than a department with a greater share of surnames like Wang and Zhang. Departments may take the corresponding incentives into account when considering candidates. Thus, Chinese universities may have an incentive to focus on fields like economics, if for budget reasons, they tend to hire junior Chinese faculty who collaborate with non-Chinese senior faculty. These incentives could even be operating on the level of a graduate student's first paper, which can set the student on a career path to a particular field. Thus, a Professor Johnson in economics might be more disposed to mentoring a student with the surname of Zhang as a potential coauthor than a student with the surname of Clark, whereas a Professor Wang, especially in management, might be more indifferent. As these examples imply, citation conventions could create competitive advantages or barriers for certain nationalities or

⁹ http://en.wikipedia.org/wiki/List_of_common_Chinese_surnames

¹⁰ <http://www.bloomberg.com/visual-data/best-and-worst/most-common-in-china-surnames>

ethnicities or even possibly genders in certain academic fields, especially if cross-nationality or cross-gender negotiations tend to be more fraught.

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Tables

TABLE I
AVERAGE QUALITY OF INCENTIVE-COMPATIBLE COAUTHORS

| First-author letter | Incentive-compatible coauthors | | | | | |
|------------------------|--------------------------------|--------------|--------------|-----------------|---|---------------------------|
| | Alphabetical | | | Nonalphabetical | | |
| <i>A</i> | (A_H, B_H) | (A_H, C_H) | (A_H, B_M) | (A_H, B_L) | (A_H, C_M) | (A_H, C_L) |
| | (A_M, B_M) | (A_M, C_M) | (A_M, B_L) | (A_M, C_L) | | |
| | (A_L, B_L) | (A_L, C_L) | | | | |
| <i>B</i> | (B_H, C_H) | | (B_H, C_M) | | (B_H, C_L) | (B_H, A_M) (B_H, A_L) |
| | (B_M, C_M) | | (B_M, C_L) | | | (B_M, A_L) |
| | (B_L, C_L) | | | | | |
| <i>C</i> | | | | | (C_H, A_M) (C_H, B_M) (C_H, A_L) (C_H, B_L) | |
| | | | | | (C_M, A_L) (C_M, B_L) | |

Notes: We list only incentive compatible authors where the first-author is better than the second. The second-author options of first-authors are decreasing on their letters due to the loss of ties in quality among the nonalphabetical ordered authors.

TABLE II
DESCRIPTIVE STATISTICS

| # of Authors | Management | | | | | Economics | | | | |
|------------------------------|------------|------|-----------|-----|--------|-----------|------|-----------|-----|--------|
| | N | Mean | Std. Dev. | Min | Max | N | Mean | Std. Dev. | Min | Max |
| <i>Average 10y Citations</i> | | | | | | | | | | |
| 1 | 29892 | 0.71 | 2.27 | 0 | 79.50 | 27903 | 1.12 | 2.67 | 0 | 71.10 |
| 2 | 15829 | 1.72 | 3.50 | 0 | 119.50 | 12048 | 2.34 | 4.42 | 0 | 175.10 |
| 3 | 5336 | 2.21 | 4.11 | 0 | 143.90 | 2653 | 2.84 | 4.66 | 0 | 65.10 |
| 4 | 1262 | 2.38 | 3.85 | 0 | 51.60 | 338 | 3.90 | 8.99 | 0 | 118.60 |
| ≥5 | 444 | 2.29 | 3.31 | 0 | 27.10 | 71 | 1.80 | 3.15 | 0 | 20.70 |
| <i>Alphabetical Ordering</i> | | | | | | | | | | |
| 1 | 29892 | 1.00 | 0.00 | 1 | 1 | 27903 | 1.00 | 0.00 | 1 | 1 |
| 2 | 15829 | 0.58 | 0.49 | 0 | 1 | 12048 | 0.86 | 0.35 | 0 | 1 |
| 3 | 5336 | 0.28 | 0.45 | 0 | 1 | 2653 | 0.77 | 0.42 | 0 | 1 |
| 4 | 1262 | 0.14 | 0.34 | 0 | 1 | 338 | 0.64 | 0.48 | 0 | 1 |
| ≥5 | 444 | 0.10 | 0.30 | 0 | 1 | 71 | 0.37 | 0.49 | 0 | 1 |

Notes: Average 10y citations = $1/10$ * (total citations in 10 years after publication). Alphabetical Ordering is a dummy variable which equals to 1 if authors of a paper are listed alphabetically and 0 otherwise.

TABLE III
REGRESSION OF CITATION RANK FOR SINGLE-AUTHORED PAPERS IN ECONOMICS AND MANAGEMENT

| | Dependent variable: Citation rank (0 – 100) | | | | | |
|---------------------------|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Time period | | | | | |
| | 1900-2000 | | | 1960-2000 | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Initials | -0.043 (0.028) | -0.038 (0.025) | -0.041* (0.024) | -0.052* (0.031) | -0.047* (0.026) | -0.054** (0.025) |
| Initials*econ | 0.125*** (0.041) | 0.067* (0.035) | 0.066* (0.034) | 0.070 (0.044) | 0.101*** (0.039) | 0.103*** (0.038) |
| Econ | 10.148*** (0.547) | 2.714* (1.503) | 1.642 (1.433) | 17.679*** (0.595) | -0.037 (1.512) | -0.586 (1.444) |
| Academic age | | 0.353*** (0.034) | 0.055 (0.034) | | 0.474*** (0.038) | 0.125*** (0.036) |
| Academic age ² | | -0.010*** (0.001) | -0.003*** (0.001) | | -0.012*** (0.001) | -0.005*** (0.001) |
| Pages | | 2.384*** (0.179) | 2.254*** (0.181) | | 2.582*** (0.194) | 2.422*** (0.195) |
| Pages ² | | -0.026*** (0.005) | -0.025*** (0.005) | | -0.027*** (0.005) | -0.026*** (0.005) |
| Lifetime citation | | | 0.019*** (0.001) | | | 0.017*** (0.000) |
| Constant | 30.184*** (0.378) | 6.827*** (1.345) | 7.100*** (1.323) | 32.092*** (0.419) | 4.540*** (1.394) | 5.505*** (1.374) |
| Year dummy | N | Y | Y | N | Y | Y |
| Econ*Year dummy | N | Y | Y | N | Y | Y |
| Observations | 57,795 | 57,795 | 57,795 | 41,630 | 41,630 | 41,630 |
| R ² | 0.029 | 0.270 | 0.307 | 0.081 | 0.285 | 0.332 |

Notes: Benchmark = single-authored papers in management. *Econ* = economics; *Initial* = alphabetic positioning of first letter of surname; *Academic age* = average scientific age (years since first publication) of coauthors; *Pages* = number of pages in the paper; *Lifetime citation* = total 10 years of citations of all the author's papers. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE IV
REGRESSION OF CITATION RANK FOR TWO AUTHOR PAPERS IN ECONOMICS AND MANAGEMENT

| | Dependent variable: Citation rank (0 – 100) | | | | | |
|---------------------------|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Time period | | | | | |
| | 1900-2000 | | | 1960-2000 | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Initials | 0.064** (0.025) | 0.040* (0.024) | 0.036 (0.023) | 0.046* (0.025) | 0.025 (0.024) | 0.021 (0.023) |
| Initials*econ | -0.134*** (0.037) | -0.122*** (0.034) | -0.139*** (0.033) | -0.121*** (0.037) | -0.100*** (0.034) | -0.116*** (0.033) |
| Econ | 7.186*** (0.495) | -5.753*** (1.152) | -4.811*** (1.097) | 7.595*** (0.496) | -6.388*** (1.152) | -5.396*** (1.097) |
| Academic age | | 0.486*** (0.036) | -0.003 (0.034) | | 0.514*** (0.036) | 0.016 (0.034) |
| Academic age ² | | -0.013*** (0.001) | -0.004*** (0.001) | | -0.014*** (0.001) | -0.004*** (0.001) |
| Pages | | 1.885*** (0.047) | 1.732*** (0.044) | | 1.995*** (0.052) | 1.833*** (0.049) |
| Pages ² | | -0.019*** (0.001) | -0.019*** (0.001) | | -0.021*** (0.001) | -0.020*** (0.001) |
| Lifetime citation | | | 0.016*** (0.000) | | | 0.016*** (0.000) |
| Constant | 50.002*** (0.339) | 28.201*** (0.937) | 29.347*** (0.895) | 50.276*** (0.343) | 26.929*** (0.954) | 28.321*** (0.910) |
| Year dummy | N | Y | Y | N | Y | Y |
| Econ*Year dummy | N | Y | Y | N | Y | Y |
| Observations | 55,754 | 55,754 | 55,754 | 51,864 | 51,864 | 51,864 |
| R ² | 0.009 | 0.133 | 0.188 | 0.011 | 0.134 | 0.194 |

Notes: Benchmark = coauthored papers in management. *Econ* = economics; *Initial* = alphabetic positioning of first letter of surname; *Academic age* = average scientific age (years since first publication) of coauthors; *Pages* = number of pages in the paper; *Lifetime citation* = total 10 years of citations of all the author's papers. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE V
CITATION RANK FOR SINGLE-AND TWO-AUTHOR PAPERS IN ECONOMICS AND MANAGEMENT

| | Dependent variable: Citation rank (0 – 100) | | | | | |
|---------------------------|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | Time period | | | | | |
| | 1900-2000 | | | 1960-2000 | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Initials | 0.064** (0.025) | 0.048** (0.024) | 0.045* (0.023) | 0.046* (0.025) | 0.023 (0.024) | 0.020 (0.023) |
| Initials*single | -0.107*** (0.038) | -0.085** (0.035) | -0.086** (0.034) | -0.098** (0.040) | -0.072** (0.036) | -0.075** (0.035) |
| Initials*econ | -0.134*** (0.037) | -0.131*** (0.034) | -0.151*** (0.033) | -0.121*** (0.037) | -0.097*** (0.035) | -0.115*** (0.033) |
| Initials*econ*single | 0.259*** (0.055) | 0.198*** (0.049) | 0.218*** (0.048) | 0.192*** (0.057) | 0.196*** (0.052) | 0.215*** (0.051) |
| Single | -19.818*** (0.508) | -14.040*** (0.487) | -13.446*** (0.474) | -18.184*** (0.541) | -12.398*** (0.503) | -11.799*** (0.486) |
| Econ | 7.186*** (0.495) | -5.185*** (0.966) | -4.739*** (0.923) | 7.595*** (0.496) | -6.077*** (0.966) | -5.380*** (0.922) |
| Single*econ | 2.962*** (0.738) | 7.105*** (0.686) | 6.436*** (0.667) | 10.083*** (0.775) | 5.564*** (0.718) | 4.865*** (0.694) |
| Academic age | | 0.401*** (0.025) | 0.009 (0.024) | | 0.481*** (0.026) | 0.051** (0.025) |
| Academic age ² | | -0.011*** (0.001) | -0.003*** (0.001) | | -0.012*** (0.001) | -0.004*** (0.001) |
| Pages | | 2.169*** (0.089) | 2.034*** (0.091) | | 2.308*** (0.101) | 2.151*** (0.103) |
| Pages ² | | -0.023*** (0.002) | -0.023*** (0.002) | | -0.024*** (0.002) | -0.024*** (0.002) |
| Lifetime citation | | | 0.017*** (0.000) | | | 0.016*** (0.000) |
| Constant | 50.002*** (0.339) | 24.097*** (0.954) | 24.339*** (0.945) | 50.276*** (0.343) | 21.701*** (1.027) | 22.550*** (1.018) |
| Year dummy | N | Y | Y | N | Y | Y |
| Econ*Year dummy | N | Y | Y | N | Y | Y |
| Observations | 113,549 | 113,549 | 113,549 | 93,494 | 93,494 | 93,494 |
| R ² | 0.090 | 0.259 | 0.300 | 0.089 | 0.240 | 0.291 |

Notes: Benchmark = coauthored papers in management; *Econ*=economics; *Initial* = alphabetic positioning of first letter of surname; *Academic age* = average scientific age of coauthors (years since first publication); *Pages* = number of pages in the paper; *Lifetime citation* = total 10 years of citations of all the author's papers. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE VI
REGRESSION OF TOP-FIVE AND BOTTOM-FIVE JOURNALS

| | Dependent variable: Citation rank (0 – 100) | | | |
|--|---|----------------|------------------|-----------------|
| | Single-author | | Two author | |
| | 1900-2000 | 1960-2000 | 1900-2000 | 1960-2000 |
| <i>Top-5 econ journals</i> | | | | |
| Initial*econ | 0.045 | 0.088 | -0.149*** | -0.106** |
| | (0.044) | (0.054) | (0.047) | (0.047) |
| <i>Bottom-5 econ journals</i> | | | | |
| Initial*econ | 0.132** | 0.150** | -0.150** | -0.132** |
| | (0.064) | (0.065) | (0.062) | (0.062) |
| Controlled for | | | | |
| Author level | Y | Y | Y | Y |
| Journal level | Y | Y | Y | Y |
| Year, discipline fixed effect and their interactions | Y | Y | Y | Y |

Notes: Benchmark = coauthored papers in management; *Econ* = economics; *Initial* = alphabetic positioning of first letter of surname. Top-five economics journals: *American Economic Review*, *Quarterly Journal of Economics*, *Journal of Political Economy*, *Econometrica*, *Review of Economic Studies*. Bottom-five economics journals (in our sample of 23 economics journals, according to a 5-year impact factor in 2012: *International Economic Review*, *Journal of Law and Economics*, *Journal of Economic Theory*, *Econometric Theory*, *Games and Economic Behaviors*). All 30 management journals are included in the benchmark. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE VII
NONALPHABETICAL VERSUS ALPHABETICAL TWO AUTHOR PAPERS IN ECONOMICS

| | Dependent variable: Citation rank (0 – 100) | | | | | |
|---------------------------|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Time period | | | | | |
| | 1900-2000 | | | 1960-2000 | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Initial | -0.059** (0.028) | -0.065** (0.026) | -0.080*** (0.025) | -0.066** (0.028) | -0.062** (0.026) | -0.077*** (0.025) |
| Initial*nonalpha | -0.061 (0.081) | -0.100 (0.073) | -0.094 (0.072) | -0.043 (0.080) | -0.068 (0.075) | -0.059 (0.073) |
| Nonalpha | -7.071*** (1.104) | -4.179*** (1.008) | -3.170*** (0.985) | -5.927*** (1.102) | -4.443*** (1.030) | -3.436*** (1.005) |
| Academic age | | 0.408*** (0.054) | -0.015 (0.054) | | 0.412*** (0.054) | -0.020 (0.054) |
| Academic age ² | | -0.012*** (0.002) | -0.005** (0.002) | | -0.012*** (0.002) | -0.004** (0.002) |
| Pages | | 1.902*** (0.067) | 1.743*** (0.062) | | 1.930*** (0.071) | 1.764*** (0.065) |
| Pages ² | | -0.019*** (0.001) | -0.018*** (0.001) | | -0.020*** (0.001) | -0.019*** (0.001) |
| Lifetime citation | | | 0.012*** (0.000) | | | 0.012*** (0.000) |
| Constant | 58.179*** (0.383) | 22.719*** (1.154) | 25.468*** (1.108) | 58.634*** (0.381) | 22.247*** (1.173) | 25.174*** (1.125) |
| Year dummy | N | Y | Y | N | Y | Y |
| Econ*Year dummy | N | Y | Y | N | Y | Y |
| Observations | 24,096 | 24,096 | 24,096 | 23,244 | 23,244 | 23,244 |
| R ² | 0.009 | 0.167 | 0.217 | 0.007 | 0.148 | 0.200 |

Notes: The results reported include only two author economics papers. *Nonalpha* = nonalphabetical ordering of author names; *Initial* = alphabetic positioning of first letter of surname; *Econ* = economics; *Academic age* = average scientific age of coauthors (years since first publication); *Pages* = number of pages in the paper; *Lifetime citation* = total 10 years of citations of all the author's papers. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE VIII
REGRESSION OF CITATION RANK OF SINGLE AND COAUTHORED PAPERS IN ECONOMICS AND MANAGEMENT

| | Dependent variable: Citation rank (0 – 100) | | | |
|----------------|---|----------------------|----------------------|----------------------|
| | Econ single | Econ 2-author | Management single | Management 2-author |
| Initial | 0.082*** (0.029) | -0.070*** (0.027) | -0.043 (0.028) | 0.064** (0.025) |
| Constant | 40.332*** (0.395) | 57.188*** (0.361) | 30.184*** (0.378) | 50.002*** (0.339) |
| Observations | 27,903 | 24,096 | 29,892 | 31,658 |
| R ² | 0.000 | 0.000 | 0.000 | 0.000 |

Notes: Regressions run without the management benchmark. *Initial* = alphabetic positioning of first letter of surname. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Figures

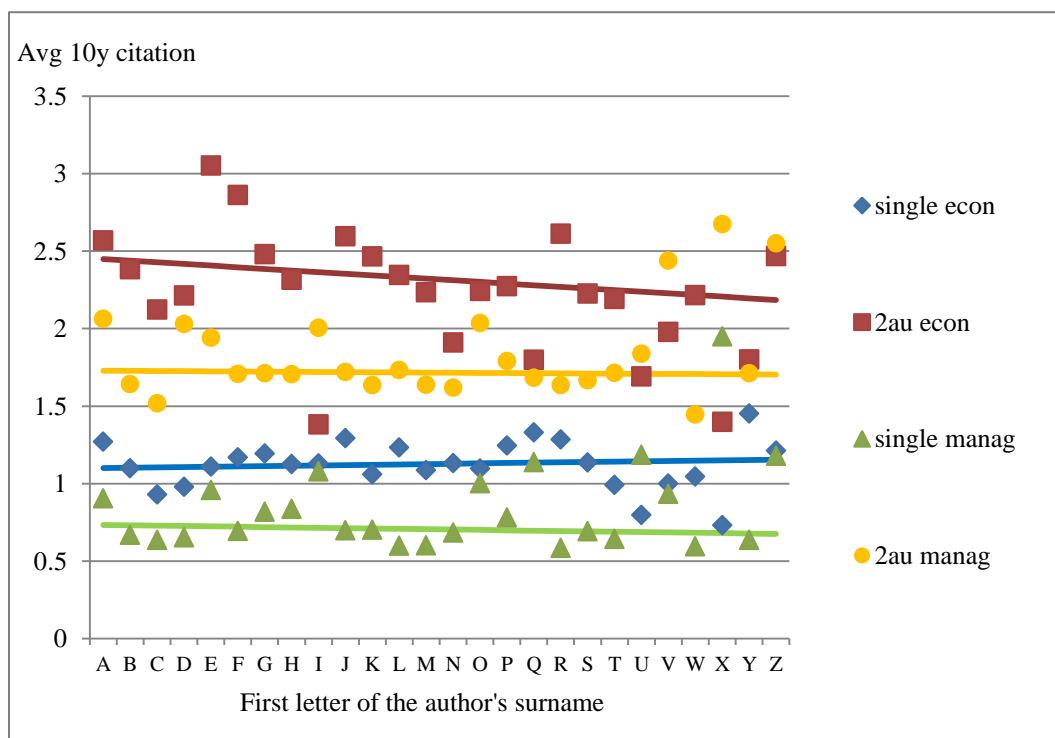


FIGURE I

AVERAGE 10 YEARS OF CITATIONS OF AUTHORS OF SINGLE-AND TWO-AUTHORED WORKS

Notes: Avg 10y citations = $1/10 * (\text{total citations in 10 years after publication})$. Based on 113,549 author-article observations from 1900 to 2000; single econ = average citations for single-authored economics papers; single management = average citations for single-authored management papers; 2au econ = average citations for two coauthored economics papers; 2au manag = average citations for two coauthored management papers.

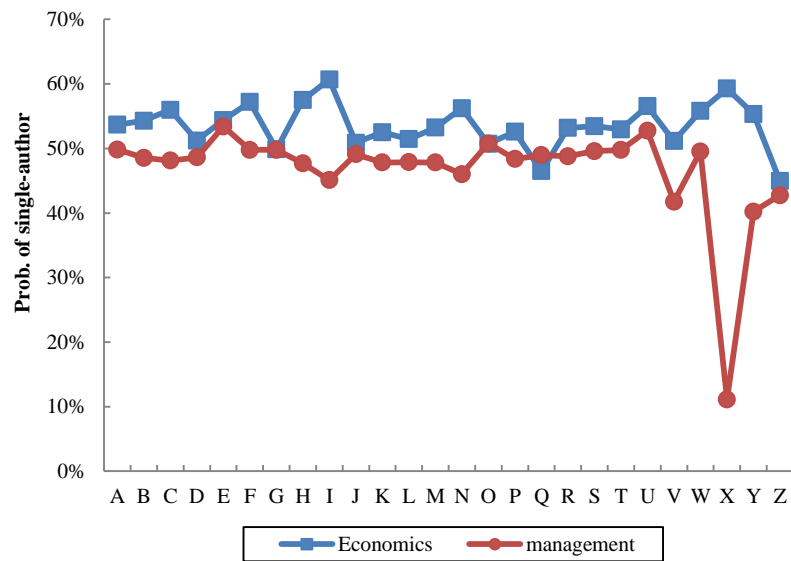


FIGURE II

FREQUENCY OF SINGLE-AUTHORSHIP IN SINGLE- AND TWO-AUTHORED PAPERS

Notes: The graph was calculated by dividing the number of single-author papers written by authors of each surname initial by the number of both single- and two-authored papers with same surname initial authors.

Appendix

TABLE A.I
LIST OF JOURNALS

| Management | Economics |
|---|---|
| Academy of Management Journal | American Economic Review |
| Academy of Management Review | Brookings Papers On Economic Activity |
| Administrative Science Quarterly | Economic Journal |
| California Management Review | Econometrica |
| Decision Sciences | Econometric Theory |
| Group and Organization Management | Games And Economic Behavior |
| Harvard Business Review | International Economic Review |
| Human Relations | Journal of Business and Economic Statistics |
| Human Resource Management | Journal of Economic Literature |
| Industrial and Labor Relations Review | Journal of Economic Perspectives |
| Industrial Relations | Journal of Economic Theory |
| Journal of Applied Psychology | Journal of Financial Economics |
| Journal of Business Research | Journal of Law and Economics |
| Journal of Business Venturing | Journal of Monetary Economics |
| Journal of Human Resources | Journal of Econometrics |
| Journal of International Business Studies | Journal of Finance |
| Journal of Management Studies | Journal of Political Economy |
| Journal of Organizational Behavior | Journal of Public Economics |
| Journal of Management | Quarterly Journal of Economics |
| Journal of Occupational And Organizational Psychology | Review of Economic Studies |
| Journal of Vocational Behavior | Review of Economics and Statistics |
| Leadership Quarterly | Review of Financial Studies |
| Monthly Labor Review | Rand Journal of Economics |
| Management Science | |
| Organizational Behavior And Human Decision Processes | |
| Organizational Research Methods | |
| Organization Science | |
| Personnel Psychology | |
| Strategic Management Journal | |
| Sloan Management Review | |

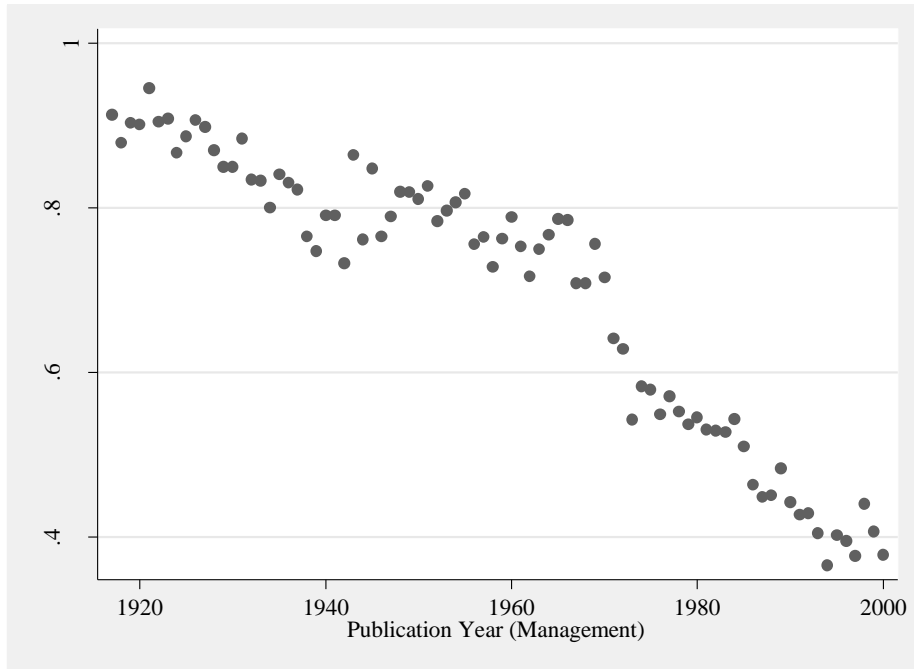


FIGURE A.I
RATE OF SINGLE-AUTHORSHIP IN MANAGEMENT

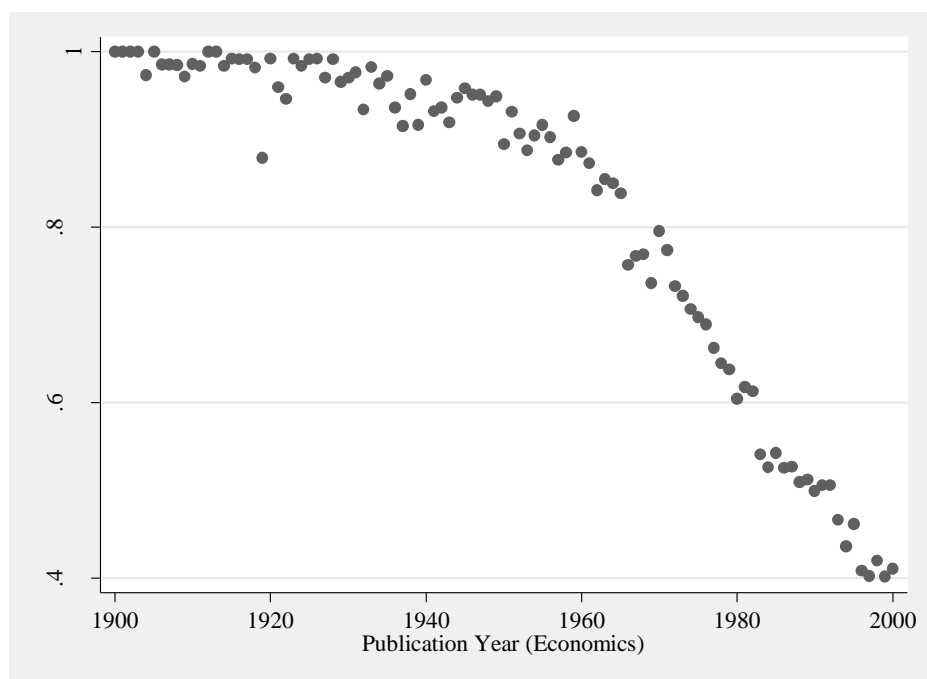


FIGURE A.II
RATE OF SINGLE-AUTHORSHIP IN ECONOMICS

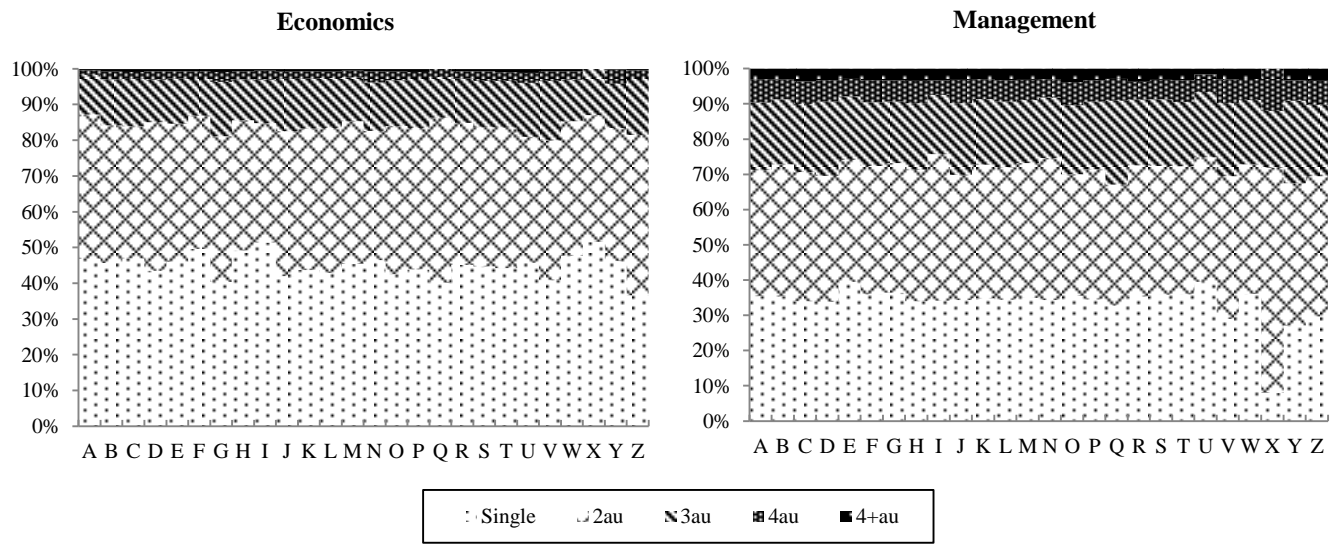


FIGURE A.III
FREQUENCY OF AUTHORSHIP BY NUMBER OF AUTHORS

Notes: In the graph, we calculated the percentage of papers with different number of authors written by authors of each surname initial.
Single=single authored papers, 2au=two-authored papers, similar for 3au, 4au and 4+au (more than four authors)