

Collaboration Incentives: Endogenous Selection into Single and Coauthorships by Surname Initials in Economics and Management*

David Ong ^{a,1}, Ho Fai Chan ^b, Benno Torgler ^{c, d}, and Yu (Alan) Yang ^e

^a HSBC Business School, Peking University, China

^b Queensland Behavioral Economics Group, Queensland University of Technology, Australia.

^c Queensland Behavioral Economics Group, Queensland University of Technology, Australia

^d CREMA – Center for Research in Economics, Management and the Arts, Switzerland.

^e Department of Economics, University of Wisconsin-Madison, USA

Many prior studies suggest that default alphabetical ordering of coauthors in economics confers undeserved professional advantages on those with earlier surname initials. However, these studies do not consider that authors select into coauthorships according to the incentives identified. We develop a model of endogenous selection into single and coauthorships around the principle that no one wants to be second-author when they expect to make the larger contribution (i.e., are of higher “quality”). We test it with authorship data from economics, with management (which does not use default alphabetical ordering) as a benchmark. We predict for economics that lower quality authors with earlier surnames would be less desirable coauthors, whereas higher quality authors with later surnames would have a lower desire to coauthor. Most desired are early initial authors of high quality, who are therefore advantaged in forming high-quality collaborations. The combined effect predicts citation rank increases on surname initial for single-authored papers and decreases for coauthored. We find both effects for economics when compared to management and absolutely. Moreover, as predicted by adverse selection for second-authors who accept even less credit, nonalphabetically ordered coauthored papers have significantly lower citation rank than alphabetically ordered papers. We discuss potential implications for the pairwise matching literature with nontransferable utility and exogenously asymmetric surplus.

JEL codes: J00, J30, C72

Keywords: alphabetic order effect, citations, coauthorships, matching, non-transferable utility

¹ Corresponding author: David Ong, Email: dvdong@gmail.com, Tel: +86-755-2603-2655, Fax: +86-755-2603-5344, Address: 708, Peking University HSBC Business School, University Town, Shenzhen, China, 518055

1. Introduction

Coauthoring is increasingly prevalent in many of the sciences, including economics (Hudson, 1996; Torgler and Piatti, 2013), marketing (Brown et al., 2006), and finance (Brown et al., 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)². 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 et al., 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 listings³.

This difference in citation convention has important consequences for both researchers and research. In terms of recognition, being first-author has tended to increase salience and attributions of credit in the past (Nudelman and Landers, 1972) because it has been until recently 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 within papers (Van Praag and 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 surname begin with A are significantly more likely to have their abstracts viewed and downloaded than authors whose surname begins with Z (Efthyvoulou, 2008).

² See Bruno (2014) for a recent review of theories of coauthorship.

³ See Waltman (2012) for a ranking by alphabetization of 25 subject categories in the mathematical, social and hard sciences, as well as the humanities.

Being listed as first-author would then also have financial repercussions; there is little disagreement that more citations lead to higher pay (Hamermesh et al., 1982; Hilmer et al., 2012; Moore et al., 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 and Yariv, 2006). Efthyvoulou (2008) confirms this higher rate of promotions in a larger sample of highly ranked research departments in the U.S. and U.K. In psychology, on the other hand, in which authors are listed by relative contribution; surname initials have no effect on promotions (Einav and 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 increases the probability of nonalphabetical ordering, while higher coauthor reputations lower 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 surname initials in single-authored, two-authored, and three-authored papers does 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 (e.g., Einav and Yariv (2006)), not by author “quality” as measured by citation rank. We address this omission by testing for 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, we predict that the second-author would only have accept less credit for the quality of the paper if the first-author with the earlier surname initials contributed more to the quality of the paper to compensate the second-author for the lost credit.⁴ 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 inference about asymmetric contributions 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-author example, we show that nonalphabetical ordering combined with the belief that this signals a greater discrepancy in the contributions of first- and second-authors breaks the symmetry between alphabetical and nonalphabetically authored papers for authors with earlier or later surname initials. These considerations leads us to positing the following incentives:

- a) Early initial lower quality authors are less preferred as coauthors.
- b) Later initial higher quality authors have a weaker preference to coauthor.
- c) Early initial authors of the highest quality have more and higher quality options for potential coauthors than later initial authors of the highest quality.
- d) However, later initials authors of lower quality should have more coauthoring options than early initial authors of lower quality.

Because of such endogenous selection by surname initial and quality, high-ability authors with earlier surname initials are advantaged because they are in the best position to form high-ability teams.

We test these for these indicators of endogenous selection into single and coauthored papers according to quality and surname initial with data from the top-23 economics journals for the period 1900–2000. We chose to include a more comprehensive set of journals because rankings

⁴ Such matches could just be more stable.

vary and we want to have a reasonable coverage. Our choice follows recent papers on journal rank in economics and management. For the economic journals, we adopted the 23 economic journals in Chan et al. (2014). They selected journals which appear at least once in the top-10 positions of a number of other prominent rankings. 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 coauthored management citations from the top-30 management journals from Podsakoff et al. (2008) as a benchmark (see Appendix Table A.1 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. We show in the Robustness Checks Section that the results are qualitatively similar when we dispense with the management benchmark.

Our findings are consistent with our predictions. This consequence suggests an alternative explanation for the prior finding that those economists with earlier surname initials are advantaged due to the greater prominence the alphabetical order citation convention gives to them. Rather, our findings suggest that some economists already take such potential advantages into account when they decide to coauthor and will only second-author and give up credit share to the first-author, if the first-author contributes more.

Besides motivating a reevaluation of the prior literature, the recent contributions to which suggest no effect from alphabetization on citations and promotions, when single authorships are also taken into account (Abramo and D'Angelo, 2017; Yuret, 2016), our findings also have implications for endogenous teams with asymmetric surplus (Wuchty et al., 2007) when the surplus from matching is nontransferable (e.g., low-quality authors cannot compensate high-quality authors to second-authors). However, because surname initials are generally regarded as exogenous to quality, our data offers clean identification of the effect of mere asymmetric surplus share on selection into pairwise matches by quality and surplus share. We discuss our contribution to the matching literature further in the Discussion Section.

1.1 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 and 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 the relative contribution convention would elicit higher efforts from authors. Hence, this theory predicts that the quality of authors *decreases* on alphabetization.

However, Brown, Chan and Lai (2006) find that quality, as measured by citations in 19 leading marketing journals, is positively correlated with alphabetical 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 heterogeneous author quality.

2. An Illustrative Example: The Coauthor 'Game'⁵

We construct a coauthor 'game' to illustrate the implications of our assumption that no one wants to be second-author when they expect to make the larger contribution. Like standard

⁵ We use the term loosely in the informal sense since all results follow from the single assumption that nobody wants to be the second-author of a paper if she is the highest quality author

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 surname begin with different letters {A, B, C} and who, based on expected citations, meet three standards of quality $H > M > L$ that authors take as given at the moment of choice. These H, M, L , types capture both the expected contribution to coauthored papers and the opportunity cost for coauthored papers.

[Insert Table 1 here]

Table 1 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.

Table 1 shows that among the alphabetical pairs, for every quality level of first-authors, the number of incentive compatible second-authors decreases in quantity, fixing the quality of the second-authors. A_H s have six options

$$\{(A_H, B_H), (A_H, C_H), (A_H, B_M), (A_H, B_L), (A_H, C_M), (A_H, C_L)\}$$

twice as many options to coauthor as B_H s, fixing quality.

$$(B_H, C_H), (B_H, C_M), (B_H, C_L)$$

C_H s have none among alphabetically ordered authors. A_M s, in turn, have twice as many as the B_M s, fixing quality. C_M s and C_L have no incentive-compatible options as first-author among alphabetical pairs.

For first-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 increase 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.

The situation reverses when we consider second-authors for whom the incentive compatible options decrease on their quality and increase on their surname initial. Among alphabetically ordered papers, C_L s have six options

$$\{(A_H, C_L), (A_M, C_L), (A_L, C_L), (B_H, C_L), (B_M, C_L), (B_L, C_L)\}$$

twice as many options to coauthor as B_L s

$$(A_H, B_L), (A_M, B_L), (A_L, B_L)$$

while A_L s have none as a second-author among alphabetical pairs.

The fact that the number and quality of options decreases on surname initials for high-quality authors would furthermore predict that the probability of single-authorships should increase on surname initial for high-quality authors. In mirror fashion, the decreasing trend for the number and the quality of coauthor options for low-quality authors would predict that the quality of single-authorships should decrease on surname initials for low-quality authors.

All of the effects we have identified should be stronger for lower tier journals (within our list of still highly prestigious journals) because the market for coauthors is thinner. The trends we identify for both single and coauthored papers could also be weaker among higher tier journals because they impose a higher publication hurdle (Joseph et al., 2005), and therefore, allow less room for other considerations among both single and coauthors.

Based on this discussion of this coauthor game, we make the following predictions for our empirical tests of endogenous selection into single and coauthorships within the economics literature, which uses the alphabetical convention, as compared to the management literature, which does not. Because raw citations follow a power law distribution (Gupta et al., 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 citations.

Predictions:

- P1. The citation rank of authors of coauthored papers in economics decrease with surname letter increment relative to papers in management (and perhaps also absolutely).
- P2. The citation rank of authors of single-authored papers in economics increase with surname letter increment relative to papers in management.

- P3. The effects predicted in P1 and P2 could be stronger for lower tier journals and for years in which coauthorships are less popular.
- P4. Economics has a higher probability of single-authorship than management.
- P5. The probability of single-authorship in economics increases on surname initials for high-quality authors and decreases on surname initials for low-quality authors.
- P6. The quality of coauthors decreases on surname initials for high-quality authors and increases on their surname initials for low-quality authors.
- P7. Early initial authors have more and higher quality coauthored works and are promoted more quickly (as already shown in the literature and discussed beforehand.)
- P8. The citation rank of papers with nonalphabetically ordered authors are lower than those of alphabetically ordered.

3. Results

We test our theoretical predictions P1–P6 and P8 using the citations from year 1900 to 2000 obtained from Thomson Reuters Web of Science⁷ 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. The mean number of papers per author in our data set is 2.76 (standard deviation = 4.28). More than 50 percent of authors write only one paper. 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. Table 2 lists a breakdown by the number of authors in each field. Most of our sample for both management (29892 papers) and economics (27903 papers) are for single-authored papers. Starting at two authored coauthored papers, economics coauthored papers (12048 papers) are relatively fewer than management (15829 papers), though they are of similar orders of magnitude. However, the mean citations and standard deviations for economics

⁷ See <http://wokinfo.com/>.

papers is non-monotonic, peaking at four coauthors papers, while that of management is relatively flat from two coauthors onwards. The key difference between the two fields is the share of alphabetical ordered coauthored papers, with economics is always much larger, with 0.86, 0.77, 0.64, and 0.37 for two, three, four, and five and over coauthors papers in economics as compared to 0.58, 0.28, 0.14, and 0.1 in management, respectively.

[Insert Table 2 here]

For each publication year, we define a paper's citation rank as c times 10 years citations⁸:

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

where $N_{citation < c}$ 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). Thus, we model the relationship between citation rank and a measure of the alphabetical location of an author's last name as:

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

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, a set of categorical dummies⁹ for *Academic age* (years since first publication), and for *Pages* (number of pages of the paper). In regards to academic age, there is a large literature showing that researchers productivity varies over time in a predictable fashion (See for example, the well cited paper Levin and Stephan (1991)). In regards to page length, there is suggestive preliminary evidence that longer papers are more cited (Ball, 2008; Stanek, 2008). Z_{jt} include

⁸ Number of citations received within 10 years after the publication.

⁹ We group *Academic age* by every two (for 0-10 years old), five (for 11-30 years old) and ten years (for over 30 years old) and assign a dummy to each group. Similarly, we group *Pages* by every five (for 1-40 paged papers), ten (for 41-50 paged papers) and twenty pages (for over 50 paged papers) and assign a dummy to each group.

publication year dummies and their interactions with the *Econ* dummy, to capture heterogeneous time trend in 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.

[Insert Figure 1 here]

Figure 1 illustrates the average citation rank for authors of single- and two-author works in both management and economics. Whereas the citation rank of single-authored papers in management nearly parallel those for coauthored works, the citation rank for coauthored papers in economics decrease both absolutely and with respect to management. The citation rank for single-authored papers in economics, however, increase both absolutely and with respect to the trend for coauthored papers in management. As Table 3–5 show, all these trends in economics are significant.

[Insert Table 3 here]

Table 3 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, still. In particular, the insignificant coefficient of *Initial* -0.043 suggests that the ranking of management authors is not affected by their surname initials. However, consistent with hypothesis P1, the significant and positive coefficient for *Initial*econ* in Table 3 indicates that the ranking of the economics authors increases by 0.125 percentage points for every increment in a surname's alphabetic positioning, with respect to the management benchmark. Thus, for every 1000 economists of single-authored papers, the rank of one economist increases (with respect to management) when his surname begins with an initial that is one letter earlier. For those whose surname begin with Z, this increase in ranking grows to $0.125 * 25 * 1000 = 31.25$ with respect to A authors. In column (2), we further control for *Academic age* (years since first publication) and *Pages*. We restrict the sample to later than 1960 (columns (5)-(6)) to control for time-changing coauthorship pattern. In particular, there seems to be a structural change after 1960 (see Appendix Figure A.1). *Initial*econ* is still positive and significant as predicted, both absolutely and compared to management. *Initial* becomes

significant, which seems to be consistent with previous findings that earlier surname authors have more citations (Huang, 2015). Results for the years 1980-2000 are qualitatively nearly identical and available on request. We dispense with the management benchmark in the Robustness Checks Section after the main results and, again, find qualitatively identical results.

[Insert Table 4 here]

Table 4 lists the results of the comparable regression for coauthored papers. Column (1) shows that 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 in column (2). The main contributing factor to the change in sign seems to be page length. In our data, 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 for each paper. Consistent with hypothesis P2, the significant and negative coefficient for *Initial*econ* in Table 4 indicates that the rank of economists decrease by a significant -0.134 percentage points for every increment in a surname's alphabetic positioning, with respect to the management benchmark¹⁰. Thus, for every 1000 economists with coauthored papers, the rank of one economist decreases (with respect to management) as compared to economists whose surname begins with one letter immediately preceding in the alphabet. This change grows to $-0.134*25*1000=-33.35$ for Z authors with respect to A authors. The trend seems to be much stronger in earlier years 1900-1959 (-0.522) than in later years 1960-2000 (-0.121). The decrease in effect size could be due to the increasing popularity of coauthorships. When coauthoring is more popular, there is thicker market for coauthors, which should mitigate adverse selection for coauthors somewhat in so far as there are more gradations of quality among potential coauthors. Again, we get qualitatively identical results for the years 1980-2000 (available on request) and when we dispense with the management benchmark in the Robustness Checks Section.

Based on our assumption that no one wants to be second-author when they are likely to contribute more to the quality of the paper, we predict in P1 and P2 that the trends for the alphabetic positioning of surname in single and coauthored papers in economics will be opposing to each other and distinct from those the corresponding management benchmarks. The

¹⁰ Interestingly, *Initial* now shows an increasing trend in management, which seems to contradict the trend identified by Huang (2015). However, our studies are not quite comparable. His study controlled for ethnicity of the names of scholars in the US.

regressions reported in Table 3 and Table 4 do indeed show that both trends are significantly different from zero and moving in opposing directions, and in fact, roughly mirror each other, depending upon the specifications compared.

We next provide a direct comparison of these two trends given coauthored management papers as the benchmark. The significant positive coefficient of *Initial*econ*single* in Table 5 offer further evidence consistent with opposing directionality of surname initial across single and coauthored papers. The significance of our findings is unchanged when we restrict the sample to 1960-2000.¹¹

[Insert Table 5 here]

We find 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, run 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).

[Insert Table 6 here]

According to Table 6, the significant positive coefficient for *Initial*econ* indicates the effect of surname initial on ranking for single-authored papers is more pronounced in the bottom-12 journals in economics of our sample, a pattern replicated by the effect of surname initials 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 Figure 2 here]

In Figure 2, we illustrate the possible consequences of the diminished incentive to coauthor in economics; namely, a 5 percent higher probability (p -value < 0.01 in t-test) of single-authorships

¹¹ In contrast, we do lose significance if we restrict the data to 1900-1960. This could be due to entry of scholars from Asia with possibly later last names becoming significant only after 1960, or more likely, because the selection into and out of coauthored works had not been significant until coauthoring became sufficiently prevalent.

than in management across all surname initials,¹² confirming P4. This gap, however, is merely suggestive of the welfare loss to authors because management could be subject to other differences in incentives to coauthor.

We run the following logit regression to examine how the probability of single-authorship varies with the initial of the surname:

$$\begin{aligned} \text{Single authorship}_{ai} = & \beta_0 + \beta_1 \text{Initial}_a + \beta_1 \text{H_quality dummy}_a + \beta_3 \text{Initial}_a * \\ & \text{H_quality dummy}_a + \varepsilon_{ai} \end{aligned} \quad \text{Eq.(2)}$$

[Insert Table 7 here]

Table 7 shows the marginal effects. The dependent variable equals to one if the paper is single-authored and zero if it is coauthored. The *H*- and *L*-quality authors are defined as those whose average citation rank of all their papers is more than one standard deviation above or below the mean, defined for each field of economics or management. For better comparison, we drop authors whose average citation rank are within one standard deviation of the mean and use *L*-quality authors as the benchmark for the regression. Consistent with P5, the significant negative coefficient for *Initial* in column (1) shows that within economics, *L*-quality authors have a lower probability of writing single-authored papers when their surname initials are later (-0.002), in contrast to the increasing trend (0.003) for *H*-quality authors. (The significant positive coefficient for *Initial* in column (2) shows that management exhibits the opposite trends. We leave the explanation of that for future work.) The coefficients of *Initial*econ* and *Initial*H-quality author dummy*econ* in column (3) further confirm the significance of the differences when we use management as the benchmark.

We now examine how the quality of the coauthor in two-authored papers varies with the author's surname initial, *fixing* the author quality as either high (*H*) or low (*L*). Table 8 shows the summary statistics table of author quality.

[Insert Table 8 here]

In Table 8, we see that we have roughly twice the number of observations for management that we do for economics for each quality (*H*, *M*, *L*) category of author. The mean citations are

¹² The gap increases to 10 percent (p-value < 0.01 in t-test) if we include coauthored papers with more than two authors. See Figure A.2 in the Appendix.

similar between economics and management except for the average citation rank of low-quality authors, which is 2.249 for economics, but 0.574 for low-quality management. Lifetime citation for high-quality economics authors (186.138) is also twice that of high-quality management authors (90.489).

We calculate the quality of the coauthor of author i by measuring the average citation rank (0-100) of all papers written by that coauthor, then regress on i 's surname initial, controlling i 's quality.

$$\begin{aligned} Coauthor\ quality_{ij} = & \beta_0 + \beta_1 Initial_i + \beta_1 H_quality\ dummy_i + \beta_3 Initial_i * \\ & H_quality\ dummy_i + \varepsilon \end{aligned} \quad Eq.(3)$$

$Coauthor\ quality_{ij}$ is the quality of author i 's coauthor in a two-authored article j . $Initial_i$ is a number from 1 to 26 representing the surname initial (from A to Z) of author i . The H - and L -quality authors are defined as those whose average citation rank is more than one standard deviation above or below the mean, for each field of economics or management. L -quality authors are the benchmark. For better comparison, authors whose average citation rank is less than one standard deviation of the mean are dropped.

[Insert Table 9 here]

Consistent with P6, the significant negative coefficient for $Initial * H$ -quality author dummy (-0.360) in column (1) of Table 9 shows that the quality of coauthors for early initial authors decreases on their surname initials for high-quality authors. The significant positive coefficient for $Initial$ (0.321) shows that citation rank increases on their surname initials for low-quality authors. Interestingly, the significant positive coefficient for $Initial$ (0.114) in column (2) shows that management displays the same trends for low-quality and for high-quality (-0.172) coauthors. The smaller coefficients for management suggests that while adverse selection by surname initial is still present even in fields that do not have the alphabetical ordering convention, the effect is weaker. The regression in column (3), which includes data from both economics and management confirms the impression that the effect in management is indeed smaller than in economics.

[Insert Table 10 here]

The outcomes related to the P8 prediction, that the citation rank of papers with nonalphabetically ordered authors are lower than those of alphabetically ordered, are reported in Table 10. Only two-authored economics papers are included. Alphabetically ordered papers are treated as the benchmark. The significant negative coefficient for *nonalpha* in column (1) without controls and column (2) with controls of Table 10 shows that nonalphabetically listed author names in two-author works have a significantly lower citation rank. However, the insignificant coefficient for *Initial*nonalpha* indicates that the trend for citation rank on surname initial for nonalphabetical papers is insignificantly lower than the alphabetical benchmark. Consistent with endogenous selection, the decrease in the intercept of the citation rank as indicated by the significant negative coefficient for *nonalpha* suggests that the handicap of having a later surname initial in the context of the alphabetical ordering convention is not corrected for by nonalphabetical ordering. Rather, this decrease in citation rank suggests that papers with nonalphabetical ordered authors have significantly lower quality. This is consistent with nonalphabetical ordering selecting for lower contributing second-authors, who are willing to tolerate the even greater loss of credit from nonalphabetical ordering only because they contribute less/ have worse outside options. Thus, while first-authors of papers in nonalphabetical order get a larger share, that share is of a smaller pie. Moreover, the smaller pie effect dominates the larger share effect.

4. 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. The significant positive coefficient for *Initial* (0.082) for single-authored economics papers in column (1) of Table 11 shows that the positive trend when we use management as the benchmark is still positive when we dispense with management as the benchmark. The significant negative coefficient for *Initial* in column (2) shows that the negative trend for coauthored papers that we find for economics with management as benchmark is still negative (-0.070), when we dispense with management as the benchmark. For single-authored papers in management, the trend is still insignificant at (-0.043). As noted in the discussion of Table 4, the

positive trend for management coauthored papers (0.064) becomes insignificant with more controls.

[Insert Table 11 here]

As an alternative, we can also examine the average citation rank of all papers written by each author, and treat it as a measure of the author quality. However, in this case, we cannot distinguish between single-authored and coauthored papers anymore. Instead, we calculate share of single-authored papers among all papers written by each author. Table 12 columns (1) - (4) include authors whose share of single-authored papers is greater than 0.5, i.e., who mostly single-author. In economics, the significant coefficient for *Initial* in odd numbered columns indicates that the quality of authors increases with surname initials in economics. However, the insignificant coefficient in the even columns indicates that the trend is insignificant and the magnitudes of coefficients are close to zero for management. Columns (5) - (8) include authors whose share of single-authored papers is less than 0.5, i.e., who mostly coauthor with other people. In contrast, these authors' quality decreases with surname initials in economics, but show no trend in management. We further restrict the sample to authors who only write two-authored papers in columns (9) and (10). The results are consistent with Columns (5) - (8). In Table 3–Table 12, 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.

[Insert Table 12 here]

5. Discussion

To sum up, we derived and tested for indicators of self-selection into single and coauthored papers consistent with the principle that no one wants to be second-author when they are likely to have a greater contribution than the first-author. We confirm 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 also confirm the negative citation rank trend on author initials for coauthored economics

papers, again, as compared to management coauthored and alone. Indeed, consistent with endogenous selection into single and coauthored papers by surname and quality, the negative trend for authors of coauthored papers roughly mirrored the positive trend for authors of single-authored papers. These roughly cancelling are consistent with the net zero effect found in subsequent work (Abramo and D'Angelo, 2017). Our findings suggest that these trends from initials are stronger for lower tier than for higher tier journals. Also consistent with our predictions, the citation trend for the coauthors of higher quality authors was negative while that of coauthors for low-quality authors was positive. Moreover, the probability of single-authorship increases for higher quality authors but decreases for lower quality authors. Furthermore, consistent with endogenous selection, the handicap of having a later surname initial seems only exacerbated by nonalphabetical ordering of coauthors; The citation rank of authors in nonalphabetical ordered papers is significantly lower than that of alphabetical ordered papers. This suggests that being on a better team in economics, and generating more credit, is better than having greater share of the credit.

Innumerable considerations enter into the decision to coauthor. Yet, our findings indicate that the arcane *potential* difference in credit conferred by surname initials could have a measurable effect on the choice. Though our findings with coauthored papers are consistent with the handicapping effect of surname initial (as posited by the prior literature), our findings with single-authors are not. We show theoretically that the trends we find for both single and coauthored papers could be due purely to authors self-selection into single and coauthorships in the *anticipation* of such potential handicapping in coauthorships due to alphabetical ordering. However, presumably, the self-selection out of coauthorships by surname initial indicates that authors are avoiding such potential handicapping. Thus, our finding suggests that economists with later surname initials have at least partially mitigated the adverse effects of the alphabetical ordering convention on them by endogenously selecting into single and coauthored papers by their surname initial and by their quality. Indeed, recent work challenge prior findings of the existence of a handicap due to later surname initials (Abramo and D'Angelo, 2017; Yuret, 2016).

Our findings can moreover help explain a number of findings and resolve what appear to be conflicting results in the prior literature. The consequence of adverse selection into nonalphabetical ordered surname in coauthorships predicted by P8 would help explain the high correlation in the 20 social science fields between alphabetical ordering of author names and the

proportion of first-authors with early initial surname (Levitt and Thelwall, 2013). The consequence of adverse selection into nonalphabetical ordered surnames in coauthorships predicted by P8 would also help explain the higher citation rate of alphabetized versus nonalphabetized two-author articles in both economics (Joseph et al., 2005) and agricultural economics (Laband and Tollison, 2006). Such adverse selection 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 here may also help resolve the still controversial issue 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 (2015) 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 due to alphabetical versus contribution ordering convention differences across fields.

Our findings may also be relevant to the pairwise matching literature, which has generally been restricted to evidence from data on married couples. Our characterization of the incentives for economists, which have exogenously asymmetric shares of the surplus from two-authored publications are consistent with the theory of Becker (1973), which predicts that the more scarce side of the matching market benefits from its own scarcity. However, consideration of such differences in the proportion of incentive compatible matches in the pairwise matching literature has been restricted to that of the effect of sex ratio on marriage, for which endogeneity from unobserved factors is generally difficult to rule out. Moreover, bargaining share in marriage matching likely correlates with bargaining ability, and therefore, with unobserved outside options, which again, is difficult to control for. In contrast, as we show with the coauthor game above, earlier surname initial authors with higher quality have strictly more and higher quality

incentive-compatible matches. Our coauthoring data allows us to predict this effect of a larger set of higher quality options on coauthor ranking by surname initial.

Among high-ability authors, those with earlier surname initials have more and higher quality incentive-compatible matches than those with later initials. Among low-ability economists, those with later surname initials face more and higher quality incentive-compatible matches than those with earlier surname initials. The difference between high-ability authors with earlier surname initials and low-ability authors with later surname initials is that only the former can form high-ability teams, and hence, should be promoted at a higher rate. Hence, another way to explain our finding a declining citation rank for two-authored papers and an increasing citation rank for single-authored papers is that authors with different initials and quality face a different ratio of incentive-compatible potential coauthors. Moreover, we show that the asymmetry in the number and quality of options for earlier and later initial is not alleviated, but is rather worsened, when authors are nonalphabetically ordered. One potential implication of this finding for the marriage matching literature is that increasing surplus share in marriage may not necessarily increase that gender's marital surplus. Rather, the redistribution of shares induces selection of lower quality people into those lower surplus share matches.

References

- Abramo, G., & D'Angelo, C. A. 2017. Does your surname affect the citability of your publications? *Journal of Informetrics*, 11(1), 121–127.
- Ball, P. 2008. A longer paper gathers more citations. *Nature*, 455(7211), 274–275.
- Becker, G. S. 1973. A Theory of Marriage: Part I. *Journal of Political Economy*, 81(4), 813–46.
- Brown, C., Chan, K., & Chen, C. 2011. First-author conditions: evidence from finance journal coauthorship. *Applied Economics*, 43(25), 3687–3697.
- Brown, C., Chan, K., & Lai, P. 2006. Marketing journal coauthorships: An empirical analysis of coauthor behavior. *Journal of Marketing Education*, 28(1), 17–25.
- Bruno, B. 2014. Economics of co-authorship. *Economic Analysis and Policy*, 44(2), 212–220.
- Chan, H. F., Frey, B. S., Gallus, J., & Torgler, B. 2014. Academic honors and performance. *Labour Economics*, 31, 188–204.
- Chung, K. H., Cox, R. A. K., & Kim, K. A. 2009. On the relation between intellectual collaboration and intellectual output: Evidence from the finance academe. *The Quarterly Review of Economics and Finance*, 49, 893–916.
- Ductor, L. 2015. Does co-authorship lead to higher academic productivity? *Oxford Bulletin of Economics and Statistics*, 77(3), 385–407.
- Efthyvoulou, G. 2008. Alphabet Economics: The link between names and reputation. *The Journal of Socio-Economics*, 37(3), 1266–1285.
- Einav, L., & Yariv, L. 2006. What's in a surname? The effects of surname initials on academic success. *The Journal of Economic Perspectives*, 151(3712), 867–8.
- Engers, M., Gans, J., Grant, S., & King, S. 1999. First-author conditions. *Journal of Political Economy*, 107(4), 859–883.
- Gupta, H. M., Campanha, J. R., & Pesce, R. A. G. 2005. Power-law distributions for the citation index of scientific publications and scientists. *Brazilian Journal of Physics*, 35(4a), 981–986.
- Hamermesh, D. S., Johnson, G. E., & Weisbrod, B. A. 1982. Scholarship, Citations and Salaries: Economic Rewards in Economics. *Southern Economic Journal*, 49, 472–481.
- Hilmer, C. E., Hilmer, M. J., & Ransom, M. R. 2012. Fame and the Fortune of Academic Economists: How the Market Rewards Influential Research in Economics. *IZA Discussion Paper*.
- Hollis, A. 2001. Co-authorship and the output of academic economists. *Labour Economics*, 8(4), 503–530.
- Huang, W. 2015. Do ABCs get more citations than XYZs? *Economic Inquiry*, 53(1), 773–789.
- Hudson, J. 1996. Trends in multi-authored papers in economics. *The Journal of Economic Perspectives*, 10(3), 153–158.
- Joseph, K., Laband, D. N., Patil, V., Southern, S., Journal, E., & Jan, N. 2005. Author order and research quality. *Southern Economic Journal*, 71(3), 545–555.

- Laband, D. N., & Tollison, R. D. 2000. Intellectual Collaboration. *Journal of Political Economy*, 108(3), 632.
- Laband, D. N., & Tollison, R. D. 2006. Alphabetized coauthorship. *Applied Economics*, 38(14), 1649–1653.
- Lazear, E. P., & Oyer, P. 2007. Personnel Economics. *NBER Working Paper*.
- Levin, S. G., & Stephan, P. E. 1991. Research Productivity Over the Life Cycle: Evidence for Academic Scientists. *American Economic Review*, 81(1), 114–132.
- Levitt, J. M., & Thelwall, M. 2013. Alphabetization and the skewing of first authorship towards last names early in the alphabet. *Journal of Informetrics*, 7(3), 575–582.
- Medoff, M. H. 2003. Collaboration and the quality of economics research. *Labour Economics*, 10(5), 597–608.
- Moore, W., Newman, R., & Turnbull, G. 2001. Reputational capital and academic pay. *Economic Inquiry*, 39(4), 663–671.
- Nudelman, A., & Landers, C. 1972. The Failure of 100 Divided by 3 to Equal 33-1/3. *American Sociologist*, 7, 9.
- Podsakoff, P. M., MacKenzie, S. B., Podsakoff, N. P., & Bachrach, D. G. 2008. *Scholarly Influence in the Field of Management: A Bibliometric Analysis of the Determinants of University and Author Impact in the Management Literature in the Past Quarter Century*. *Journal of Management* (Vol. 34).
- Redner, S. 2005. Citation statistics from 110 years of physical review. *Physics Today*, 58(6), 49–54.
- Sauer, R. D. 1988. Estimates of the Returns to Quality and Coauthorship in Economic Academia. *Journal of Political Economy*, 96(4), 855–66.
- Stanek, K. Z. 2008. How long should an astronomical paper be to increase its Impact? *Working Paper*.
- Torgler, B., & Piatti, M. 2013. *A Century of American Economic Review*. New York: Palgrave/MacMillan.
- Van Praag, C. M., & Van Praag, B. M. S. 2008. The Benefits of Being Economics Professor A (rather than Z). *Economica*, 75(300), 782–796.
- Waltman, L. 2012. An empirical analysis of the use of alphabetical authorship in scientific publishing. *Journal of Informetrics*, 6(4), 700–711.
- Wuchty, S., Jones, B., & Uzzi, B. 2007. The increasing dominance of teams in production of knowledge. *Science*, 316(5827), 1036–1039.
- Yuret, T. 2016. Does alphabetization significantly affect academic careers? *Scientometrics*, 108(3), 1603–1619.
- Zuckerman, H. A. 1968. Patterns of Name Ordering Among Authors of Scientific Papers: A Study of Social Symbolism and Its Ambiguity. *American Journal of Sociology*, 74(3), 276–291.

Tables

Table 1

Average Quality of Incentive-Compatible Coauthors

First-author letter	Incentive-compatible coauthors					
	Alphabetical			Nonalphabetical		
A	(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)				
B	(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)					
C						(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 decrease on their letters due to the loss of ties in quality among the nonalphabetical ordered authors.

Table 2
Descriptive Statistics

# of Authors	Management					Economics				
	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max
Average 10y Citations										
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
Alphabetical Ordering										
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. Mean citation per paper. Std is for # of authors of paper. Max and min citation is for 10 years. *N* is number of papers.

Table 3
Regression of Citation Rank for Single-authored Papers in Economics and Management

	Dependent variable: Citation rank (0 – 100)					
	Time period					
	1900-2000		1900-1959		1960-2000	
	(1)	(2)	(3)	(4)	(5)	(6)
Initial	-0.043 (0.028)	-0.037 (0.025)	-0.022 (0.061)	-0.013 (0.060)	-0.052* (0.031)	-0.048* (0.026)
Initial*econ	0.125*** (0.041)	0.062* (0.035)	0.102 (0.080)	0.013 (0.076)	0.070 (0.044)	0.093** (0.039)
Econ	10.148*** (0.547)	3.051** (1.488)	-4.397*** (1.070)	11.384*** (2.820)	17.679*** (0.595)	0.335 (1.491)
Constant	30.184*** (0.378)	30.988*** (5.836)	24.756*** (0.822)	57.604** (27.877)	32.092*** (0.419)	30.846*** (5.843)
Controlled for						
Academic age dummies	N	Y	N	Y	N	Y
Page dummies	N	Y	N	Y	N	Y
Year dummies	N	Y	N	Y	N	Y
Econ*Year dummies	N	Y	N	Y	N	Y
Observations	57,795	57,795	16,165	16,165	41,630	41,630
R ²	0.029	0.278	0.002	0.133	0.081	0.301

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 authors; *Pages* = number of pages in the paper. Robust standard errors clustered by paper are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4
Regression of Citation Rank for Two-Author Papers in Economics and Management

	Dependent variable: Citation rank (0 – 100)					
	Time period					
	1900-2000		1900-1959		1960-2000	
	(1)	(2)	(3)	(4)	(5)	(6)
Initial	0.064** (0.026)	0.034 (0.024)	0.229** (0.113)	0.161 (0.110)	0.046* (0.026)	0.017 (0.024)
Initial*econ	-0.134*** (0.037)	-0.116*** (0.035)	-0.522** (0.229)	-0.498** (0.214)	-0.121*** (0.037)	-0.093*** (0.035)
Econ	7.186*** (0.564)	-5.085*** (1.575)	-5.025 (3.356)	13.026 (9.275)	7.595*** (0.563)	-5.677*** (1.570)
Constant	50.002*** (0.387)	58.085*** (5.232)	47.354*** (1.664)	40.636*** (9.163)	50.276*** (0.391)	58.524*** (5.280)
Controlled for						
Academic age dummies	N	Y	N	Y	N	Y
Page dummies	N	Y	N	Y	N	Y
Year dummies	N	Y	N	Y	N	Y
Econ*Year dummies	N	Y	N	Y	N	Y
Observations	55,754	55,754	3,890	3,890	51,864	51,864
R ²	0.009	0.137	0.014	0.149	0.011	0.140

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 authors; Pages = number of pages in the paper. Robust standard errors clustered by paper are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5
Citation Rank for Single-and Two-Author papers in Economics and Management

	Dependent variable: Citation rank (0 – 100)					
	Time period					
	1900-2000		1900-1959		1960-2000	
	(1)	(2)	(3)	(4)	(5)	(6)
Initial	0.064** (0.026)	0.038 (0.025)	0.229** (0.113)	0.236** (0.112)	0.046* (0.026)	0.012 (0.024)
Initial*single	-0.107*** (0.038)	-0.075** (0.035)	-0.252* (0.129)	-0.251** (0.127)	-0.098** (0.040)	-0.061* (0.036)
Initial*econ	-0.134*** (0.037)	-0.123*** (0.035)	-0.522** (0.229)	-0.572*** (0.210)	-0.121*** (0.037)	-0.090*** (0.035)
Initial*econ*single	0.259*** (0.055)	0.185*** (0.050)	0.624*** (0.242)	0.594*** (0.224)	0.192*** (0.058)	0.180*** (0.052)
Single	-19.818*** (0.541)	-13.481*** (0.520)	-22.598*** (1.855)	-21.067*** (1.873)	-18.184*** (0.573)	-11.409*** (0.523)
Econ	7.186*** (0.564)	-4.118*** (1.198)	-5.025 (3.355)	4.273 (3.998)	7.595*** (0.563)	-4.904*** (1.194)
Single*econ	2.962*** (0.786)	6.463*** (0.736)	0.628 (3.521)	9.597*** (3.290)	10.083*** (0.819)	4.581*** (0.755)
Constant	50.002*** (0.387)	52.149*** (3.854)	47.354*** (1.663)	55.866*** (20.118)	50.276*** (0.391)	51.956*** (3.922)
Controlled for						
Academic age dummies	N	Y	N	Y	N	Y
Page dummies	N	Y	N	Y	N	Y
Year dummies	N	Y	N	Y	N	Y
Econ*Year dummies	N	Y	N	Y	N	Y
Observations	113,549	113,549	20,055	20,055	93,494	93,494
R ²	0.090	0.264	0.072	0.171	0.089	0.251

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 authors; Pages = number of pages in the paper. Robust standard errors clustered by paper are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6
Regression of Top-11 and Bottom-12 Journals of Our Sample

	Dependent variable: Citation rank (0 – 100)			
	Single-author		Two-author	
	1900-2000	1960-2000	1900-2000	1960-2000
	(1)	(2)	(3)	(4)
Top-11 econ journals				
Initial*econ	0.044 (0.059)	0.091 (0.062)	-0.093* (0.055)	-0.057 (0.055)
Bottom-12 econ journals				
Initial*econ	0.130** (0.063)	0.155** (0.063)	-0.128** (0.061)	-0.106** (0.061)
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-11 and bottom-12 economics journals (in our sample of 23 economics journals) are ranked by the 5-year impact factor in 2012. All 30 management journals are included in the benchmark. Robust standard errors clustered by paper are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7
 Logit Regression of Single-authorship on Quality and Surname Initial of authors

Dependent variable	Single-authored paper = 1 / coauthored paper = 0		
	Econ	Management	Both (management as benchmark)
	(1)	(2)	(3)
Initial	-0.002*	0.002**	0.002**
	(0.001)	(0.001)	(0.001)
<i>H</i> -quality author dummy	-0.481***	-0.437***	-0.444***
	(0.012)	(0.010)	(0.010)
Initial* <i>H</i> -quality author dummy	0.003**	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)
Initial*econ			-0.003***
			(0.001)
Initial* <i>H</i> -quality author dummy*econ			0.007***
			(0.002)
Econ			0.158***
			(0.015)
<i>H</i> -quality author dummy*Econ			-0.054***
			(0.020)
Observations	19,764	31,128	50,892
Pseudo R ²	0.151	0.175	0.168

Notes: The coefficients are marginal effects taking variables at the mean values. The unit of observations is paper-author. Each paper appears N times, where N is the number of authors of that paper. Dependent variable is a dummy variable, which equals to 1 if the paper is single-authored and 0 if coauthored. The *H*- and *L*-quality authors are defined as those whose average citation rank of all papers is more than one standard deviation above or below the mean, for each field. *L*-quality authors are the benchmark. Authors whose average citation rank is less than one standard deviation of the mean are dropped. *Initial* = alphabetic positioning of first letter of surname; *Econ* = economics. Standard errors in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8
Summary Statistics of Author Quality

Economics	Obs	Mean	Std. Dev.	Min	Max
<i>L</i> -quality authors					
Average citation rank	3,638	2.249	4.331	0.035	14.915
Lifetime total citations	3,638	0.326	1.077	0	19
<i>M</i> -quality authors					
Average citation rank	11,039	44.258	14.819	14.926	69.774
Lifetime total citations	11,039	51.706	118.199	1	3393
<i>H</i> -quality authors					
Average citation rank	3,211	81.258	8.231	69.799	100
Lifetime total citations	3,211	186.138	400.545	1	6481
<hr/>					
Management	Obs	Mean	Std. Dev.	Min	Max
<i>L</i> -quality authors					
Average citation rank	8,491	0.574	1.867	0.035	10.108
Lifetime total citations	8,491	0.164	1.964	0	153
<i>M</i> -quality authors					
Average citation rank	20,013	42.456	16.867	10.173	70.451
Lifetime total citations	20,013	32.841	90.402	1	2345
<i>H</i> -quality authors					
Average citation rank	6,876	82.991	8.161	70.456	100
Lifetime total citations	6,876	90.489	201.452	1	4483

Note: The *L*-, *M*-, and *H*-quality authors are defined as those whose average citation rank of all papers is one standard deviation below, within and above the mean, for each field.

Table 9

Regression of Quality of Coauthors in Two-authored Papers on Quality and Surname Initial of authors

Dependent variable	Quality of coauthor in two-authored papers		
	Econ	Management	Both (management as benchmark)
	(1)	(2)	(3)
Initial	0.321*** (0.073)	0.114*** (0.042)	0.114*** (0.043)
<i>H</i> -quality author dummy	41.987*** (1.069)	60.981*** (0.659)	60.981*** (0.684)
Initial* <i>H</i> -quality author dummy	-0.360*** (0.080)	-0.172*** (0.050)	-0.172*** (0.052)
Initial*Econ			0.207** (0.082)
Initial* <i>H</i> -quality author dummy*Econ			-0.187** (0.093)
Econ			17.170*** (1.081)
<i>H</i> -quality author dummy*Econ			-18.994*** (1.225)
Constant	26.987*** (0.972)	9.817*** (0.540)	9.817*** (0.560)
Observations	6,811	9,981	16,792
R ²	0.414	0.749	0.673

Notes: Only coauthors in two-authored papers are included. Quality of coauthor in each paper is measured by the average citation rank (0-100) of all papers written by that coauthor. The *H*- and *L*-quality authors are defined as those whose average citation rank of all papers is more than one standard deviation above or below the mean, within each field. *L*-quality authors are the benchmark. Authors whose average citation rank is within one standard deviation of the mean are dropped. *Initial* = alphabetic positioning of first letter of surname of the author; *Econ* = economics. Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table 10
 Nonalphabetical versus Alphabetical Two-Author Papers in Economics

	Dependent variable: Citation rank (0 – 100)			
	Time period			
	1900-2000		1960-2000	
	(1)	(2)	(3)	(4)
Initial	-0.059** (0.029)	-0.084*** (0.025)	-0.066** (0.029)	-0.081*** (0.025)
Initial*nonalpha	-0.061 (0.084)	-0.081 (0.073)	-0.043 (0.082)	-0.048 (0.073)
Nonalpha	-7.071*** (1.268)	-3.173*** (1.119)	-5.927*** (1.248)	-3.360*** (1.125)
Constant	58.179*** (0.434)	39.285*** (5.433)	58.634*** (0.431)	39.326*** (5.469)
Controlled for				
Academic age dummies	N	Y	N	Y
Page dummies	N	Y	N	Y
Year dummies	N	Y	N	Y
Observations	55,754	55,754	51,864	51,864
R ²	0.009	0.223	0.007	0.208

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 (years since first publication) of authors; *Pages* = number of pages in the paper. Robust standard errors clustered by paper are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11
 Regression of Citation Rank of Single and Coauthored Papers in Economics and Management

	Dependent variable: Citation rank (0 – 100)			
	Econ single	Econ two-author	Management single	Management two-author
	(1)	(2)	(3)	(4)
Initial	0.082*** (0.029)	-0.070*** (0.027)	-0.043 (0.028)	0.064** (0.026)
Constant	40.332*** (0.395)	57.188*** (0.410)	30.184*** (0.378)	50.002*** (0.387)
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 clustered by paper are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 12

Regression of Author Quality on Surname Initial of authors

Dependent variable	Author quality (average citation rank (0-100) of all papers)									
	Share of single paper>0.5		Share of single paper=1		Share of single paper<0.5		Share of single paper=0		Share of two-author paper=1	
	Econ	Management	Econ	Management	Econ	Management	Econ	Management	Econ	Management
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Initial	0.118** (0.049)	0.002 (0.041)	0.129** (0.055)	0.021 (0.043)	-0.109*** (0.039)	0.006 (0.027)	-0.110** (0.047)	0.015 (0.029)	-0.115* (0.063)	0.057 (0.045)
Constant	29.786*** (0.659)	23.693*** (0.544)	25.979*** (0.736)	21.739*** (0.580)	52.132*** (0.524)	48.524*** (0.362)	50.490*** (0.633)	47.821*** (0.393)	48.169*** (0.858)	43.582*** (0.608)
Observations	6,784	11,027	5,502	9,751	8,653	22,047	6,701	19,648	3,855	8,892
R ²	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000

Notes: The dependent variable is the author quality, measured by the average citation rank (0-100) of all papers written by each author. *Initial* = alphabetic positioning of first letter of surname; *Econ* = economics. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Figures

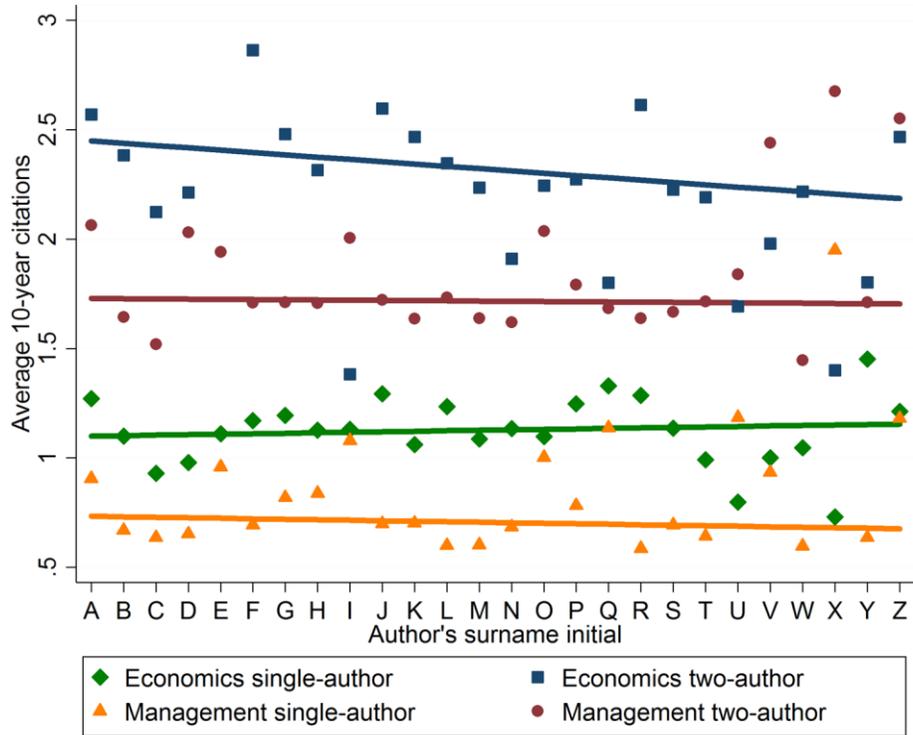


Figure 1

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-authored economics papers; 2au manag = average citations for two-authored management papers.

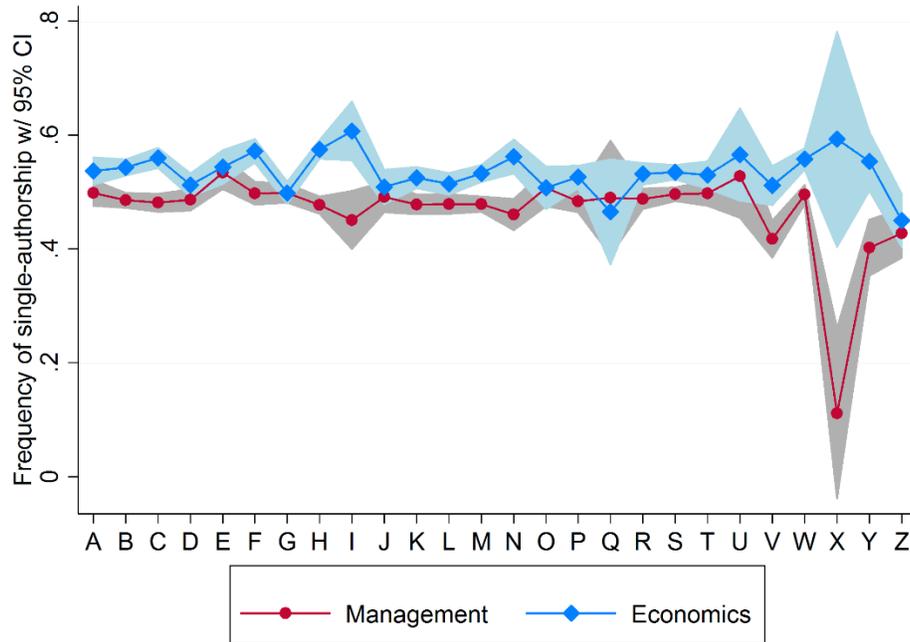


Figure 2

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.1
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	

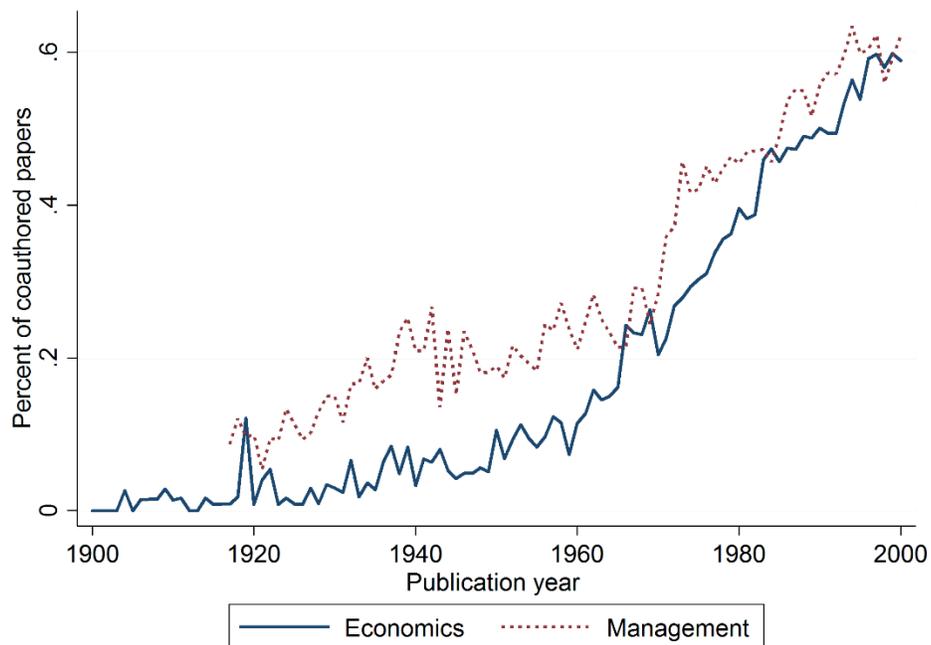


Figure A.1
Rate of Coauthorships in Economics and Management

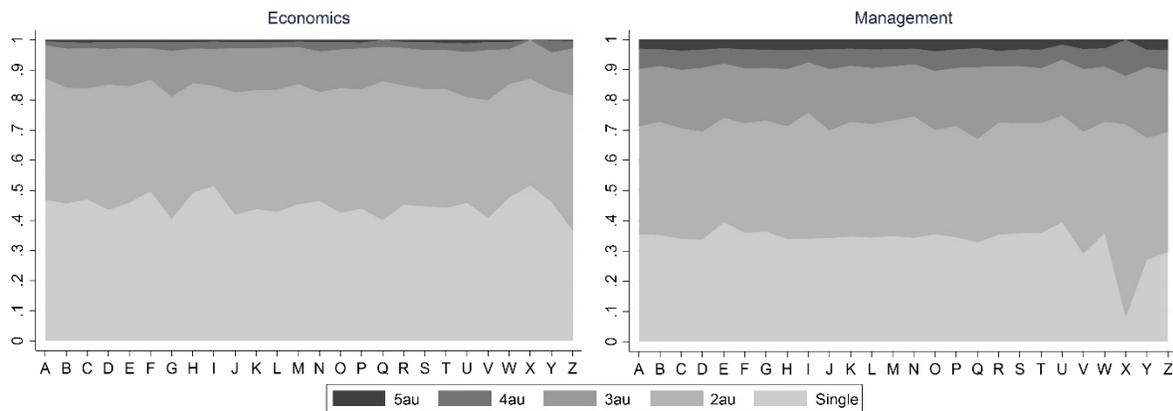


Figure A.2
Frequency of Authorship by Number of Authors

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)