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THE CASE OF ECONOMICS

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ABSTRACT

We study how citation patterns differ between journal tiers in economics. Concretely, we analyze citations patterns of more than 6,000 economics research articles published in top five, second tier, and top field economics journals between 1992 and 1996. In line with previous literature, we find that top five journals' articles generally receive more citations and that the life cycles of those citations are longer. However, their influence (in term of citations) is overestimated: in its first twenty (five) years since publication, the median top five article accumulates 4.25 (around 3) as many citations when compared to the second tier and top field median article. We show that this ratio is strongly associated with the field of economics research (e.g. this ratio is the lowest for econometric methods papers) and with articles' impact (e.g. in all fields of economics research, except for theory, this ratio decreases sharply as one moves toward high-impact articles in term of citations).

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1. Introduction

Economics scholars place a strong emphasis on publishing in a narrow set of top general research journals (Gibson, 2014; McKenzie, 2014; Heckman and Moktan, 2018), a trend which seems to have deepened in the last decades (Card and DellaVigna, 2013). Annual submissions to top five economics journals—i.e., the American Economic Review (AER), Econometrica (ECA), the Journal of Political Economy (JPE), the Quarterly Journal of Economics (QJE) and the Review of Economic Studies (RES)—nearly doubled from 1990 to 2012. However, since the total number of articles published in these journals actually declined, publishing in these journals has become a much more difficult and slow process (Card and DellaVigna, 2013).

This emphasis on top five outlets seems to have a powerful influence on the direction of research in economics, the reputation and pay of economics scholars, the decision of funding agencies, as well as on departments' and universities' rankings (Hamermesh, 2018; Serrano, 2018; Gibson, Anderson, and Tressler, 2017; Verma, 2015; Gibson, Anderson, and Tressler, 2014; Ellison, 2013; Zimmermann, 2013; Hamermesh and Pfann, 2012; Hazelkorn, 2011; Hilmer et al., 2015; Oswald, 2007; Hilmer and Hilmer, 2005; Smith and Eysenck, 2002; Cole and Cole, 1967). For this reason, it is not uncommon to read claims such as “*The economics profession rewards one research paper in a top five journal more than say five good publications in journals outside this narrow set...*” (McKenzie, 2014).

When the focus is placed on young faculty careers, literature (Schimanski and Alperin, 2018) shows that, in academy in general, promotion and tenure reviewers commonly look at the venue of publication as a proxy for quality. When the focus is placed on economics, recent research (see, for example, Heckman and Moktan, 2018) shows that publishing in top five journals is a powerful determinant of tenure and promotion. In particular, it shows that publishing in top five journals greatly increase the probability of receiving tenure during the first spell of tenure-track employment and through the seventh year of such employment. It also shows that junior faculty members rank top five publications as having the greatest influence on their tenure and promotion outcomes.

In parallel to top five publications counts, economics scholars also have drawn more and more on quantitative indicators based on citation counts (or, alternatively, use metrics which

take citation counts as input) to assess researchers and research institutions performance (see, for example, Seeber, 2019; Gibson, Anderson, and Tressler, 2017; Hazelkorn, 2015; Gibson, Anderson, and Tressler, 2014; Ellison, 2013; Cole and Cole, 1967). However, exceling performance in terms of citation counts does not necessarily go hand in hand with publication venue reputation. An example may be illustrative: a top tier economics journal may focus its articles on theory or econometric methods papers, while a second tier or top field one may focus its articles on applied ones. As applied papers have been shown to receive, in general, more citations than theory and econometric methods ones (see Anauati, Galiani and Gálvez, 2016; Angrist and Pischke, 2017), the second tier journal could end up surpassing the top tier one in terms of citation performance.

Therefore, to better understand the relations between these two strategies for assessing researchers' performance, empirical evidence aimed at quantifying and characterizing how journal tiers relate with citation performance is needed. In this article we delve into this issue. Concretely, we do this by providing answers to the following questions: Do total received citations differ between articles published in top five and well respected non-top five economics journal (i.e., second tier and top field journals)? Do the dynamics of received citations (i.e., life cycles) differ across journal tiers?¹ If differences are to be found, do they vary across articles' impact? In other words, is a highly/slightly cited article published in a non-top five journal more or less similar (in terms of received citation) to one published in a top five journal? Importantly, are these patterns similar or different across fields of economics research (i.e., applied, applied theory, econometric methods, and theory articles)?

To provide answers to these questions, we constructed a dataset containing detailed citation and articles' characteristic data. We did this by first listing all research articles published between 1992 and 1996 in the top five economics journals, a sample of second tier general interest journals and a sample of top field journals. We then collected data on how yearly received citations evolved as articles grow older. Finally, we classified each article into one of four fields of economics research (theory, applied research, applied theory and

¹ Note that as bibliometric indices usually restrict the range of articles that they use as input on the basis of the number of years that have passed since their publication, annual trends in citations may strongly influence the values of these indices.

econometric methods). Our final dataset contains detailed information on 1,313,314 citations received by 6,083 economics' articles.

We find that citation patterns effectively vary greatly across journal tiers, both in magnitude and behavior. Our results show that these patterns are strongly associated to fields of economics research and articles' impact (as measured by citation counts), and suggest that the great emphasis of academic economics on top five journals should be taken with care due to articles' heterogeneity. In view of that, and in line with previous research, our results point out that it may be convenient to assign a greater weight in the determination of economic and reputational rewards to factors such as citation counts (as suggested in Hamermesh, 2018) and departmental peer-review of a candidates' work (as suggested in Heckman and Moktan, 2018). However, we believe these criteria should also consider and be adjusted by fields of economics research.

This paper contributes to a growing body of literature on quantitative economics that addresses the relevant papers' characteristics, their citation performance and journals' decisions about what to publish. To the best of our knowledge, our paper is the first to analyze the heterogeneity in citation patterns across journal tiers considering fields of economics research and articles' impact. In general, most of the literature has focused on top five journals leaving out second tier and field journals and/or ignoring the methodology used by articles. For instance, in terms of the publishing process, it has been documented that it has slowed down in top five journals (Ellison, 2002; Trivedi, 1993; Laband, 1990; Yohe, 1980; and Coe and Weinstock, 1967) mainly due to lower acceptance rates and longer delays. In relation to citation performance and fields of economics research, Chiappori and Levitt (2003) use data on all empirical microeconomics papers published in AER, JPE and QJE over 1999 and 2001 to assess whether theoretical economic research succeeds in influencing the path of empirical microeconomics research. They find that theoretical papers cited as a primary motivation for empirical research projects are surprisingly dispersed; with very few theoretical papers having much of an influence on applied microeconomics papers. Anauati, Galiani and Gálvez (2016) characterize how life cycles in yearly citations differ across fields of economic research in top five journals, finding strong differences in citation patterns across fields of economics research. The present article shares some methodological

decisions with Anauati, Galiani and Gálvez (2016) but aims at answering a different question: in Anauati, Galiani and Gálvez (2016) the focus is placed on analyzing citation patterns across fields of economics research, here we focus on characterizing citation patterns across journal tiers.

Closely related papers focusing on how citations vary across economic journals are those of Hammermesh (2018), Heckman and Moktan (2018), Wohlrabe and Bornmann (2017), Stern (2013) and Oswald (2007). Using a sample of 230 articles published in the top five journals, the *Economic Journal* and the *Review of Economics and Statistics* in 2007–2008, Hammermesh (2018) finds substantial overlap in citations (adjusted for its length) between these journals. According to this author, a very few papers in top journals generate immensely more citations than other papers published in those journals or elsewhere. In other words, a very few outliers determine our perceptions of journal quality and these perceptions ignore the great heterogeneity of articles within and across journals. Heckman and Moktan (2018), in a broader analysis that examines the influence of top five publication on promotion and tenure decisions, find that a substantial share of influential publications appears in non-top five outlets and that the comparability between top five and non-top five journals publications increases considerably when one focuses on the lesser-cited top five journals. Wohlrabe and Bornmann (2017) aim at facilitating fair research evaluations in economics by applying field- and time-normalization of citation impact to articles published in 294 journals (containing 192,524 papers). By running their analysis, they identify 33 outstandingly cited economics journals. Notably, although this set includes the top five outlets, it is not the case that top five journals are the top five ranked journals in it. Oswald (2007) uses data on accumulated received citations over twenty-five years by papers published in 1981 in issues of the *AER*, *ECA*, *Journal of Public Economics*, *Economic Journal*, *Journal of Industrial Economics*, and the *Oxford Bulletin of Economics and Statistics*. He finds that the variation in the quality of journals, as measured by cites, is strikingly large. He reports that the more highly-cited articles in “good-to-medium” quality journals have 10 times the citation impact of the slightly cited articles published in the top journals, and that the less highly cited articles in the top journals are easily bettered by good articles in less prestigious outlets. The author also highlights there is a noticeably imperfect match between the quality of the journal and the lifetime cites of individual articles. Finally, Stern (2013) studies uncertainty associated with

citations-based rankings by computing the standard error of impact factors for every economics journal with a five-year impact factor in the 2011 Journal Citations Report. He finds that outstanding impact factors of the top two journals are well defined, and that an elite group of 9–11 mainstream journals can be fairly reliably distinguished. Additionally, he reports that the four bottom ranked journals are also fairly clearly set apart.

Our paper differs from these articles in that it uses a fine-grained dataset including yearly citations to more than 6,000 articles from top five, second tier general interest and top field journals, while also categorizing articles fields of economics research. This allows us not only to focus on general patterns across journal tiers, but also on the interactions between journal tiers and fields of economics research (which we show are far from negligible). This represents a novel contribution to previous literature focusing solely on journal tiers and with respect to Anauati, Galiani and Gálvez (2016) which focuses only on top five journals and fields of research.

The rest of this paper is organized as follows: Section 2 describes how we built our dataset. Section 3 covers our empirical analysis and main results. Section 4 provides discussion and concludes.

2. Data

As a first step for constructing our dataset, we selected a set of journals to include into each tier under analysis (i.e., top five, second tier and top field). Although, there is a consensus regarding which journals are considered top five journals (i.e., AER, ECA, JPE, QJE, and RES), classifying journals into second tier or top field tiers is more subjective. As second tier general research journals we included a sample of well-respected journals publishing articles covering general research topics; concretely, our sample of second tier journals includes the Economic Journal, Economic Inquiry, the European Economic Review, the Journal of Economic Literature (JEL), the Journal of Economic Perspectives (JEP), the International Economic Review, and the Review of Economics and Statistics. As top field journals we included a sample of well-respected journals known for focusing in one particular area of research; concretely our sample of top field journals includes the Journal of Development Economics, the Journal of Econometrics, the Journal of Economic Behavior and Organization, the Journal of Economic Theory, the Journal of Health Economics, the Journal

of International Economics, the Journal of Labor Economics, the Journal of Law and Economics, the Journal of Monetary Economics, the Journal of Public Economics, the Journal of Urban Economics, and the RAND Journal of Economics.

A caveat should be made on the inclusion of the JEP and the JEL into the second tier general research category. Even though these outlets publish articles on a broad range of topics (which made us place them in the general research category) and are well regarded in the discipline but are not considered top five (which made us place them in the second tier category), they also differ in content from other second tier journals selected. The JEP is a journal that publishes articles normally solicited by the editors aimed at disseminating newer economic ideas and findings. The JEL also publishes papers mostly invited by the editors, and commonly offers literature reviews on selected topics (although original research is also published in it). Both of these journals are known for having an excellent performance in terms of citation counts and have even been found to surpass the citation impact of less cited top five journals (see for example Wohlrabe and Bornmann, 2017). This is why, to check the robustness of our results, the Online Appendix presents our main results excluding these two outlets.

Once these journals were chosen, using EconLit we listed all articles published in each of them from 1992 to 1996, and gathered their title, the name(s) of their author(s), their JEL codes, and their publication information (pages, journal's name and volume).² Based on both the title of the paper and subsequent checks, we excluded articles we identified as comments/replies, addresses/speeches and corrections. Like Card and DellaVigna (2013), we also excluded articles in the Papers and Proceedings of the AER. This left us with a final dataset of 6,083 full-length refereed articles.

Then, from Google Scholar, we collected detailed data on citations received by each article from two years before publication—to capture citations to preprints—up to and including twenty years since its publication. We refer as *total citations* received by an article to the sum of yearly citations received by an article during this time span covering 23 years. Data was

² We chose the window from 1992 to 1996 to cover a time span of at least 20 years. The reason behind this choice is that, as shown in Anauati, Galiani, and Gálvez (2016), citations of top five journals' articles have been found to have a life cycle that lasts approximately 20 years.

retrieved from the end of March 2017 to the end of May 2017. For roughly 9.7% of all articles, citation data could not be identified by automatic means.³ A few citations of articles in Google Scholar do not have a timestamp attached to them; we noted that these citations tend to have a low impact (i.e., they are associated with a null citation count or non-formal scholarly documents), and we therefore decided to ignore the small subset of citations which do not have a timestamp.

As in Hamermesh (2013) and Anauati, Galiani and Gálvez (2016), the field of research corresponding to each paper was identified by skimming each paper. We classified each article into one and only one of the following research fields: applied, applied theory, econometric methods and theory. The criteria used to assign a paper to a category are as follows: 1) *Applied papers* are papers that have an empirical or applied motivation. They rely on the use of econometric or statistical methods as a basis for analyzing empirical data, although they may deal with simple models that serve as a theoretical framework for the analysis. This category also includes papers which do not use sophisticated econometric methods, but do use descriptive statistics to analyze, for example, given features of an economy and in which the empirical section figures as the central element. 2) *Applied theory* papers develop a theoretical model to explain a fact; the empirical analysis is not the most important feature of the paper, but a supplement. In these papers, the use of econometric or statistical analyses is limited, although they may use simulations (even with empirical data) or refine other techniques to test the implications of the models. 3) *Econometric methods* papers are articles that develop econometric or statistical methodologies. They also include papers that develop methodologies for collecting data and that address issues of identification, data aggregation or optimization techniques. 4) *Theory* papers do not contain an empirical fact section; they usually approach a topic by modeling and by making extensive use of formal mathematics and logic. They may include a numerical example or a simple model calibration with theoretical data to illustrate the proposed model or analyze its comparative statics. Further information on the way in which we have classified papers into these four categories can be found in Anauati, Galiani and Gálvez (2016). Figure S1 plots the distribution of fields of economics research across the selected journals.

³ Further details on this methodology can be found in Anauati, Galiani and Gálvez (2016).

3. Characterizing citation patterns across journal tiers in economics

3.1. *Summary statistics of total citations across journal tiers and fields of economics research*

Before analyzing detailed citation patterns, Table 1 reports summary statistics at the article level considering their total received citations across journal tiers and fields of economics research (Table S1 reports this data across journals and Table S2 replicates Table 1 excluding the JEP and JEL). In top five journals, total citations per article range from 0 to 10,836, with a mean (median) of 491 (217) and 1,815 citations at the 95th percentile. For second tier journal papers, total citations range from 0 to 5,741, with a mean (median) of 147 (51) and 651 citations at the 95th percentile.⁴ The statistics describing the distribution of citations of top field journals papers are strikingly similar to second tier journal ones, with total citations ranging from 0 to 8,676 and a mean (median) of 136 (51) and 491 citations at the 95th percentile. Therefore, during the first twenty years since publication, the median top five article accumulates 4.25 as many citations when compared to the second tier and top field median article. Differences between mean and median values show that skewness in the distribution of total citation at the article level is noteworthy.⁵ Additionally, Table 1 and Table S2 reveal that citation patterns differ greatly across fields of economics research, no matter the journal tier being analyzed.

⁴ When the JEP and JEL are excluded, total citations per article range from 0 to 5,741, with a mean (median) of 114 (46) and 423 citations at the 95th percentile. It should be noted that this shift to the left in the distribution is caused mainly by a reduction of total citations received by applied papers, which predominate in the JEP and the JEL (see Figure S1).

⁵ Skewness in the distribution of citation counts has been also reported in Hamermesh (2018), Card and DellaVigna (2013), Oswald (2007) among others.

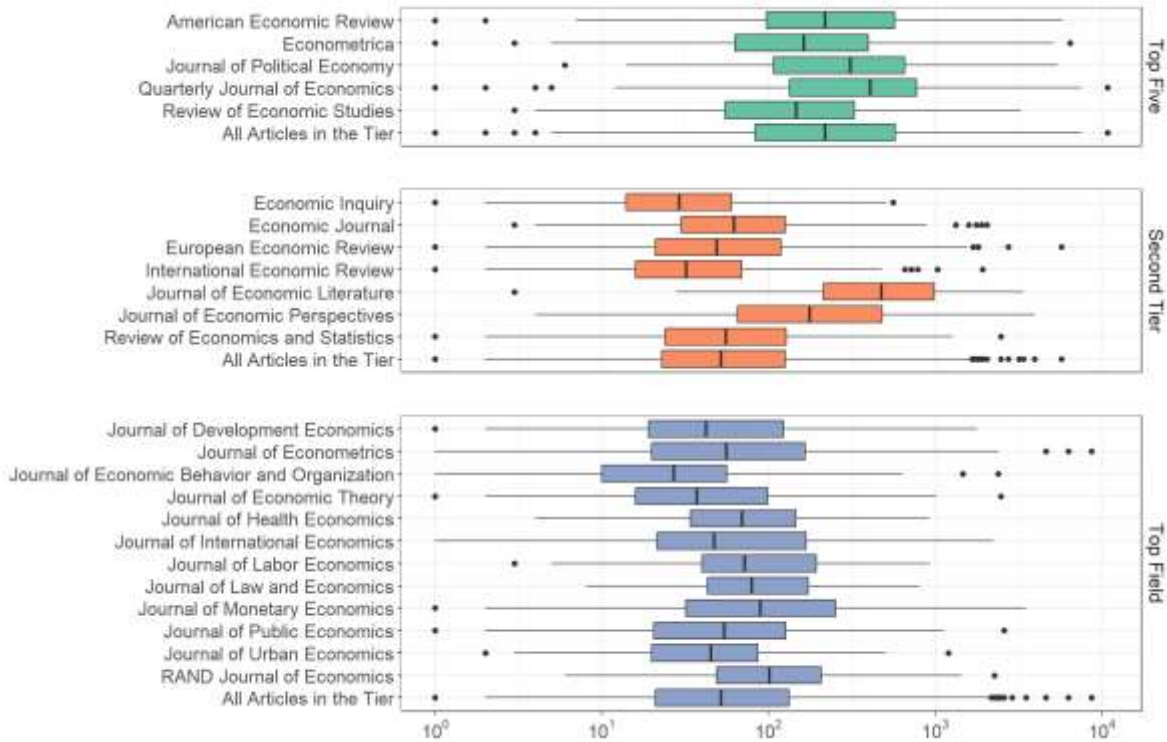
Table 1. Summary Statistics of Total Citation at the Article Level across Journals Tiers and Fields of Economics Research

Journal Tier	Research Field	5 th Percentile	Median	75 th Percentile	95 th Percentile	Mean	S.D.	Most cited	Total citations	N° of Articles
Top five	Applied	36.00	332.00	670.50	1,932.90	609.65	1,012.69	10,836	273,122	448
	Applied theory	43.70	266.00	741.50	2,410.90	604.66	851.16	4,539	96,141	159
	Econometric methods	19.60	178.00	413.25	2,062.05	432.32	734.80	5,131	49,285	114
	Theory	13.70	156.00	451.50	1,325.40	381.74	623.48	6,418	227,133	595
	All fields	19.00	217.00	573.75	1,815.50	490.64	818.35	10,836	645,681	1,316
Second tier	Applied	6.00	66.00	151.75	733.05	180.81	386.16	5,741	172,496	954
	Applied theory	4.55	54.00	158.50	684.85	168.30	331.26	3,187	35,680	212
	Econometric methods	3.00	41.50	120.25	393.95	103.35	168.04	1,030	12,609	122
	Theory	4.00	36.00	74.00	377.05	92.95	206.48	1,921	53,909	580
	All fields	5.00	51.00	125.25	651.25	147.05	324.40	5,741	274,694	1,868
Top field	Applied	8.00	80.00	187.25	584.50	169.48	289.44	3,504	160,328	946
	Applied theory	5.25	52.50	137.75	527.25	133.99	269.25	2,899	38,321	286
	Econometric methods	3.00	57.00	159.00	984.60	228.84	674.22	8,676	90,848	397
	Theory	3.00	37.00	91.00	298.55	81.45	151.38	2,467	103,442	1,270
	All fields	4.00	51.00	131.50	491.20	135.54	330.83	8,676	392,939	2,899
All tiers	Applied	9.00	95.00	251.00	1,016.40	258.07	564.61	10,836	605,946	2,348
	Applied theory	6.00	73.00	252.00	1,067.00	258.97	528.88	4,539	170,142	657
	Econometric methods	4.00	65.00	188.00	972.60	241.30	630.18	8,676	152,742	633
	Theory	4.00	47.00	130.00	702.40	157.25	364.29	6,418	384,484	2,445
	All fields	5.00	67.00	186.00	893.00	215.90	500.12	10,836	1,313,314	6,083

3.2. Citation counts overlap analysis

Table 1 shows a great heterogeneity of impact in terms of total citations. To better focus on this phenomenon, Figure 1 plots the distribution of total citations received by papers across journals as well as tiers as a whole.

Figure 1. Distribution of Total Citations by Publication Venue



Note: 1 was added to the total citations of each article to avoid dropping articles with no citations when plotting in log₁₀ scale.

One feature that arises from examining Figure 1 is that the JEL and the JEP behave quite similar, in terms of total citations, to the top five journals. It should be mentioned that these two journals have a high proportion of applied articles, specifically 57% and 82% in the JEL and the JEP respectively (see Figure S1). A second feature is that after excluding these two journals, top field journals slightly outperform second tier journals in terms of total citation counts. This is reflected in that, for the former, total citations per article range from 0 to 8,676, with a mean (median) of 136 (51) and 491 citations at the 95th percentile, whereas, for the latter, total citations per article range from 0 to 5,741, with a mean (median) of 114 (46) and 423 citations at the 95th percentile. Finally, a third feature observed is that less highly-cited articles in the top five journals are widely outperformed by articles in second tier and top field journals. To quantify this overlap, Table 2 shows the fraction of articles in each journal with total citations higher than the 10th percentile, the 25th percentile, the 50th percentile, and the 75th percentile of the AER articles' total citations distribution. Journals

are sorted in decreasing order by the fraction of citations greater than the 50th percentile of the AER articles' total citations distribution.

Table 2. Fraction of Articles with Total Citations Higher than the 10th, 25th, 50th, and 75th Percentiles of the AER articles' Total Citations Distribution, by Journal

Journal	Journal Tier	10 th Percentile	25 th Percentile	50 th Percentile	75 th Percentile
Journal of Economic Literature	Second Tier	0.95	0.89	0.73	0.45
Quarterly Journal of Economics	Top Five	0.91	0.81	0.65	0.39
Journal of Political Economy	Top Five	0.92	0.76	0.56	0.30
American Economic Review	Top Five	0.90	0.75	0.50	0.25
Journal of Economic Perspectives	Second Tier	0.83	0.67	0.47	0.19
Econometrica	Top Five	0.83	0.65	0.41	0.17
Review of Economic Studies	Top Five	0.82	0.56	0.38	0.15
Journal of Monetary Economics	Top Field	0.67	0.48	0.27	0.07
RAND Journal of Economics	Top Field	0.79	0.54	0.23	0.05
Journal of Labor Economics	Top Field	0.72	0.42	0.21	0.04
Journal of Econometrics	Top Field	0.56	0.38	0.21	0.08
Journal of International Economics	Top Field	0.53	0.34	0.20	0.06
Journal of Law and Economics	Top Field	0.75	0.43	0.18	0.03
Journal of Development Economics	Top Field	0.49	0.30	0.16	0.06
Journal of Health Economics	Top Field	0.68	0.38	0.15	0.02
Economic Journal	Second Tier	0.64	0.35	0.15	0.04
Review of Economics and Statistics	Second Tier	0.59	0.31	0.14	0.04
European Economic Review	Second Tier	0.55	0.29	0.12	0.04
Journal of Public Economics	Top Field	0.57	0.34	0.10	0.02
Journal of Economic Theory	Top Field	0.46	0.25	0.08	0.01
International Economic Review	Second Tier	0.39	0.18	0.05	0.02
Journal of Urban Economics	Top Field	0.52	0.22	0.05	0.01
Economic Inquiry	Second Tier	0.35	0.14	0.04	0.00
Journal of Economic Behavior and Organization	Top Field	0.33	0.12	0.04	0.01

Note: Journals are sorted in decreasing order by the fraction of citations greater than the 50th percentile of the AER articles' total citations distribution.

In line with previous literature (Hammermesh, 2018; Oswald, 2007) Table 2 shows that there is a strong overlap in total citations across journals. Concretely, for all of the journals considered, at least one third of their articles receive more citations than the 10th percentile of the AER articles' total citations distribution. Although top five journals rank high in this table, it is notable that the JEL is the leading journal and that the JEP outranks two top five outlets (ECA and RES, which specialize in econometric methods and theory papers—see Figure S1). The highest ranked top field journal is the Journal of Monetary Economics (27% of all its articles receive more citations than the median AER one), and the highest ranked second tier journal is the Economic Journal (17% of all its articles receive more citations than the median AER one).

3.3. *Time dynamics of received citations across journal tiers and fields of economics research*

To better understand time-dynamics of received citations, Figure 2, Figure S2 and Figure S3 plot the evolution of average and median yearly citations, as well as yearly citation trajectories for each article, for every year since two years before its publication, discriminating by journal tier and field of economics research. Concretely, being $cit_{i,t}$ the number of citations paper i receives in year t since publication, r a particular subset of papers and n_r the number of papers included in r , these figures plots the evolution $\sum_{i \in r} cit_{i,t}/n_r$ for successive values of t as well as the evolution of the median values of these citations. The main difference between Figure 2 and Figure S2 is that the former maintains a fixed y scale across panels while the latter does not. The difference between Figure S2 and Figure S3 is that the latter excludes from the analysis the JEP and the JEL.

Figure 2 shows that for every year the average and median yearly citations of top five journal papers are higher than those of the second tier and top field journals (this goes in line with Table 1 and Table S2 results). In the year of publication (i.e. year 0), the yearly average citations of top five journals articles (4.06) more than doubles the average citations of second tier (1.77—1.36 excluding the JEP and the JEL) and top field journals (1.44) articles. This difference becomes bigger as time passes: after 15 years since publication the average citations of top five articles (32.7) is around four times the average citations of second tier (8.7—6.80 excluding the JEP and JEL) and top field (8.41) journals articles, suggesting a better maturity for top five papers.

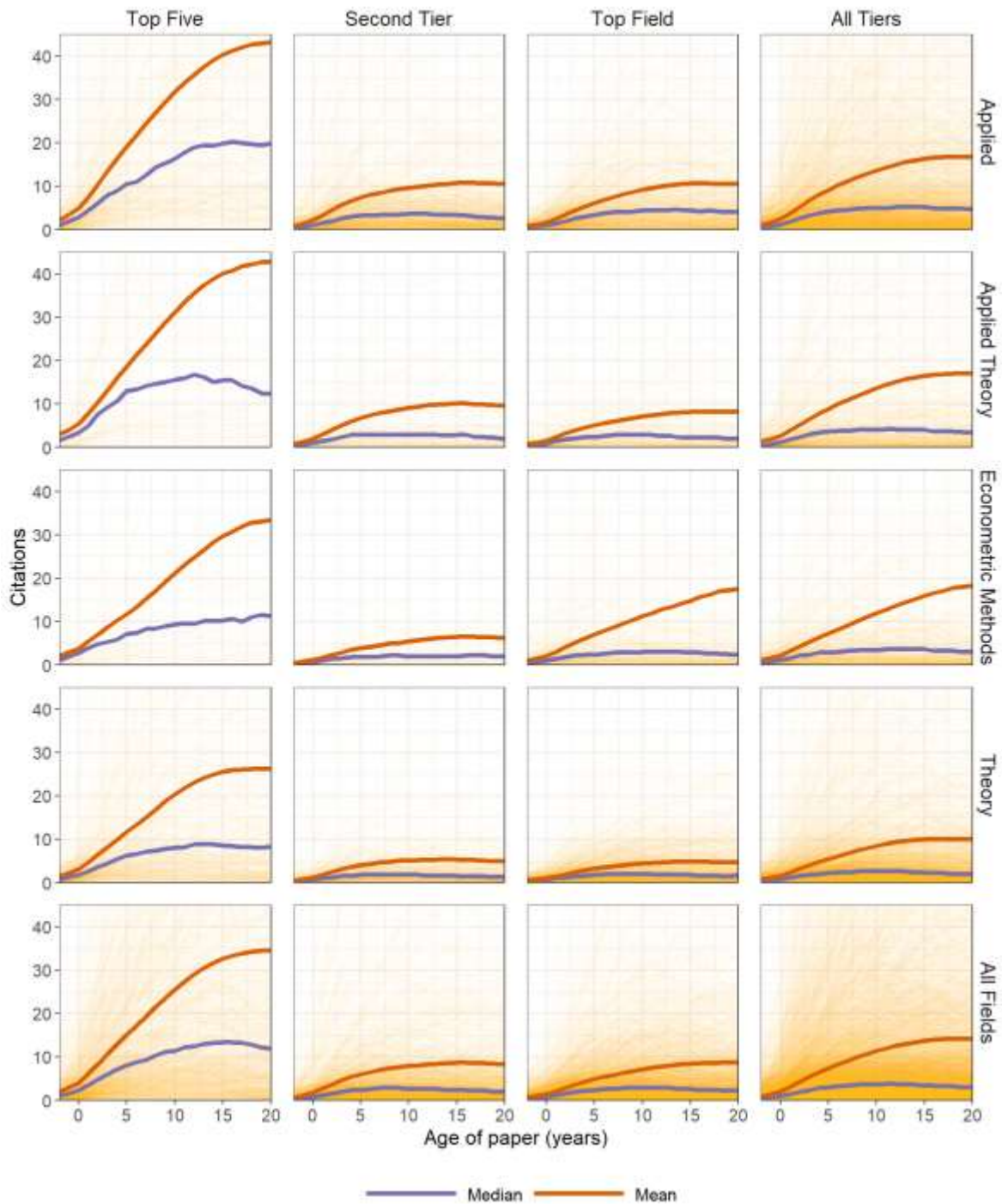
Figure 2, Figure S2 and Figure S3 show that, even without accounting for citation inflation,⁶ peaks in yearly citations are not reached at the same time across journals tiers. For articles published in top five journals, a peak in median yearly citations is reached around the fifteenth year after publication (Figure 2S allows a visual detailed inspection).⁷ This peak

⁶ Note that since we are analyzing articles published in a very short time window, citation inflation, which refers to the observed common rise in citation counts over the years, is not relevant for comparison across our sample of articles, as all of them experienced the same inflation during this period. See Althouse et al. (2009), Anauati, Galiani, and Gálvez, (2016), Galiani and Gálvez (2019), and Neff and Olden, (2010).

⁷ Note that Anauati, Galiani, and Gálvez (2016) finds that median papers published in top five journals reach their peak between three and five years after their publication. This differs from our results because Anauati, Galiani, & Gálvez (2016) examine articles published in a rather longer time window (from 1970 to 2000) which allows controlling for citation inflation.

(13.4) is more than five times as high as the peak of articles published in second tier (2.4—2.1 excluding the JEP and the JEL) or field journals (2.6). On the other hand, for articles published in second tier and top field journals, peaks are reached before in time (seven years after publication for second tier journals and eight years after publication for top field journals). This suggests that articles published in top five journals do not only receive more citations, but also that citations are received for longer periods of time; i.e. their life cycles are longer.

Figure 2. Yearly Mean and Median Citations Received by across Journal Tiers and Fields of Economics Research



Note: Mean and median citations are smoothed using five-year centered moving averages. Light orange lines show the trajectory of individual papers yearly citations.

In line with previous research, Figure 2 and Figure S2 also show that, no matter the journal tier, citation patterns—as measured by median yearly citations—are more favorable for applied and, to a lesser extent, for applied theory papers than for theory and econometric methods ones. Concretely, they receive more citations per year, have a higher peak level, and receive more citations during their first years since publication.

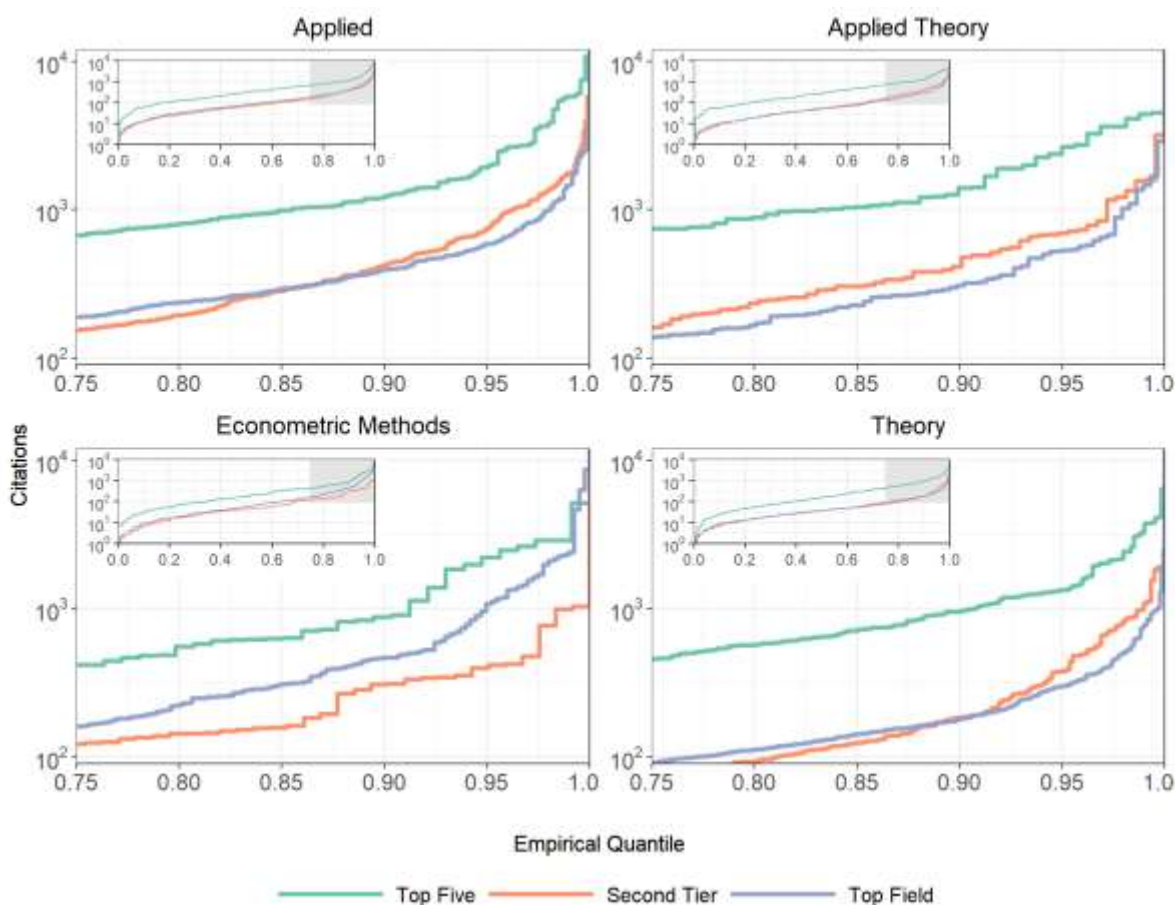
Econometric method papers are a special case. Their citation patterns in second tier journals outperform slightly that of theoretical papers. However, they behave differently in top field journals depending on whether we observe the mean or median citation. When mean citations are considered, citation patterns of this field exceeds that of applied and applied theory papers and resembles the behavior of econometric methods top five papers. Whereas, when the median is used, the performance of econometric method papers declines in relative terms compared to applied and applied theory papers. This indicates that there are very successful (in terms of citation counts) econometric method papers that received an outstandingly large amount of cites, both in the top five and top fields outlets. Detailed inspection of the data shows that the three most highly-cited econometric method articles in top field journals received 4,631, 6,313 and 8,676 citations, and that the three most highly-cited econometric method articles in top five journals received 2,627, 2,876 and 5,131 citations.

3.4. Citation patterns across journals tiers and fields of economics research

Now we place our focus on total citation patterns across journals tiers and fields of economics research. Figure 3 shows empirical quantile functions of articles' total citations. As expected, for almost all quantiles, total citations received by papers in top five journals are higher than the ones received by papers published in non-top five journals. Moreover, the distribution of cites to top five papers stochastically dominates the distribution of citations for applied, applied theory and theory non-top five journals papers. However, in the case of econometric methods, the distribution of citations of field journals crosses the distribution of top five at nearly the 99.37th percentile; pointing again toward the presence of very successful (in terms of citation counts) econometric methods articles published in top field journals—that even

outperform the most successful econometric methods articles (in terms of citation counts) published in top five journals.⁸

Figure 3. Empirical Quantile Functions of Articles' Total Citations across Journal Tiers and Fields of Economics Research



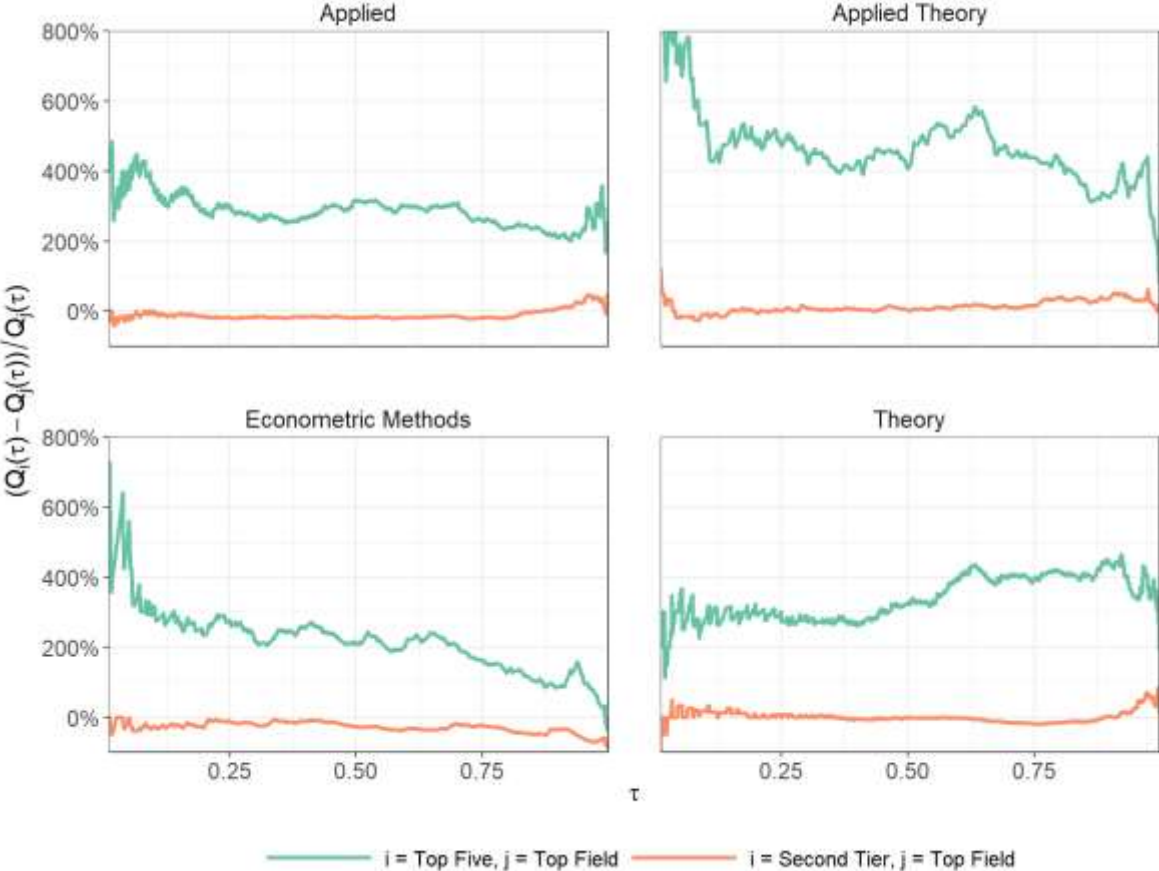
Note: 1 was added to the total citations of each article to avoid dropping articles with no citations when plotting in log10 scale.

Figure 3 also shows that, except for econometric method papers, second tier and top field journals are quite similar in terms of citations' distribution. The cumulative distribution curve of top field journals is in general slightly above the curve of second tier journals until the 87th and 91th percentile in the cases of applied and theory papers respectively, where both curves

⁸ From the inset graphs within each panel of Figure 3 it can be observed that applied, applied theory, theory and econometric methods papers in the first decile of the distribution of citations of top five journals have the same number of citations as articles in the 48th, 51th, 40th and 36th (41th, 54th, 36th and 36th) percentiles of the distribution of citations of second tier (top field) journals. This confirms once again the finding that less highly-cited articles in the top five journals are easily outperformed by median articles in second tier and top field journals.

intersect. In the case of applied theory papers, the curve of second tier journals is slightly above the curve of top field journals until the 99.5th percentile where they intersect. Finally, the cumulative distribution curve of econometric method papers in top field journals stochastically dominates the cumulative distribution curve of this type of articles in second tier journals. Figure S4 replicates Figure 3 but excludes the JEP and JEL from the analysis. In this case, the second tier articles' curve falls slightly, and it crosses the top field journal curve at the 96th and 95th percentile in the cases of applied and theory papers respectively. Additionally, now for both applied theory and econometric methods articles the top field curve dominates the cumulative distribution curve of second tier ones.

Figure 4. Percentage Difference of Empirical Quantile Functions of Articles Total Citations across Journal Tiers and Fields of Economics Research



To avoid being misguided by the logarithmic scale used in Figure 3, Figure 4 plots percentage differences of total citations' empirical quantile functions across journal tiers (Table S3 details this data for a selected subset of empirical quantiles). Concretely it plots

$(Q_i(\tau) - Q_j(\tau))/Q_j(\tau)$, where $Q_i(\tau)$ stands for the empirical quantile τ of distribution i . In this way, a value of 2 indicates that the value of $Q_i(\tau)$ triples $Q_j(\tau)$. For the sake of exposition, we now focus only on differences between articles published in top five and top field journals, since articles published in top field journals behave quite similarly to those published in second tier journals the interpretation can be generalized to them. Figure 4 shows some interesting patterns. First, and before focusing in the differences across fields of economics research, Table S3 shows that during the first two decades after publication, a top five journal article in the first tenth part of the distribution receives as many citations as those received by 3.83(4.31) second tier(top field) journal articles in the first tenth part of the distribution; while a top five journal article in the last tenth part of the distribution receives as many citations as those received by 3.31/3.76 second tier/top field articles in the last tenth part of the distribution. Second, in relative terms, the overall magnitude of the difference tends to be larger for applied theory papers and smaller for econometric methods papers. Third, and more interesting, how these differences vary across articles' impact differs greatly among fields of economics research. For applied articles, the gap narrows very mildly as one move toward more cited articles. This narrowing is sharp for the case of econometric methods papers (even converging at high values) and applied theory papers (which show a strong narrowing, but not strong enough as to attain convergence). Surprisingly, theory papers show and opposite pattern: the gap widens as one moves to highly cited papers. In other words, in all fields of economics research, except for theory, the more cited a top five article is, the relatively less successful (in terms of citation impact) it is when compared to an equivalent article published in non-top five venues; but, for theory papers, the opposite pattern is observed: highly-cited top five articles are even relatively more successful (in terms of citation counts) when compared to non-top five ones.

Finally, Figure 4 also confirms the finding that top field journals behave relatively similarly in term of citations than second tier journals. In this case, the difference moves around zero regardless the research field, which suggests that both type of journals present similar cumulative citation distributions. However, there are a few points to highlight. First, the difference is close to null for applied, applied theory and theory papers, except for the high percentiles, where it grows to a small extent. These patterns suggest that highly cited articles are slightly more successful in term of citation counts in second tier journals than in top field

ones. Second, the difference is negative and small for econometric methods articles; but it widens a bit more for highly cited articles. Figure S5 replicates Figure 4 excluding the JEP and the JEL. When these outlets are excluded, the curve falls slightly, but still moves around zero regardless the research field. This highest fall is observed for applied theory articles.

3.5. *Patterns observed for the first five years since publication*

Up to now, we presented results based on total citations counts, which we defined as all citations accumulated during the first twenty years since publication. However, given much of the concern regarding top five overemphasis is centered in its use as a signal of competence for young academics seeking tenure, here we report if the citation patterns we presented are also observed for those citations accumulated during the first years since publication (which are the ones effectively seen tenure reviewers).

Figure 5. Relation between Citations Received During the First Years since Publication and Total Citations, by Journal Tier

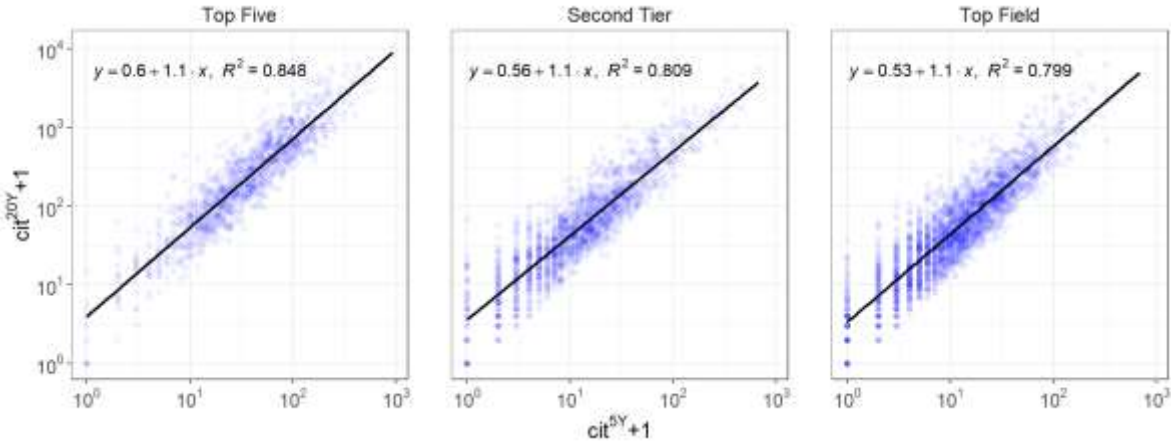


Figure 5 shows how citations received during the first 5 years since publication (cit^{5Y}) relate to total citations (cit^{20Y}). In both cases, we added 1 to the citations counts of each article and expressed them in logarithm base 10 scale. In line with previous literature showing that citations during the first years since publication correlate strongly with citations received during longer timeframes (see, for example, Wang, 2013), our data shows that, no matter the journal tier, citations received during the first years since publication are almost linearly

associated to total citations (in the log10 scale). Notably, the estimated slopes are identical across tiers.

Table 3 reports articles' median citation values across journal tiers and fields of economics research. Medians are calculated for citations received in the first five years since publication (Median 5Y) and for citations received in the first twenty (Median 20Y). Additionally, it reports the ratios between medians for citations received in the first five years since publication and medians for citations received by all top five articles during the first five years since publication (34.5 for five years since publication and 217 for twenty years since publication).

Table 3. Five Years Citations and Total Citations, by Journal Tier and Field of Economics Research

Journal Tier	Research Field	Median 5Y	Median 20Y	Median 5Y / All Top Five 5Y Median	Median 20Y / All Top Five 20Y Median
Top Five	Applied	44	332	1.28	1.53
	Applied Theory	50	266	1.45	1.23
	Econometric Methods	34	178	0.99	0.82
	Theory	25	156	0.72	0.72
	All Fields	34.5	217	1.00	1.00
Second Tier	Applied	14	66	0.41	0.30
	Applied Theory	13	54	0.38	0.25
	Econometric Methods	8	41.5	0.23	0.19
	Theory	8	36	0.23	0.17
	All Fields	12	51	0.35	0.24
Top Field	Applied	14	80	0.41	0.37
	Applied Theory	12	52.5	0.35	0.24
	Econometric Methods	13	57	0.38	0.26
	Theory	8	37	0.23	0.17
	All Fields	11	51	0.32	0.24
All Tiers	Applied	17	95	0.49	0.44
	Applied Theory	17	73	0.49	0.34
	Econometric Methods	14	65	0.41	0.30
	Theory	11	47	0.32	0.22
	All Fields	14	67	0.41	0.31

Table 3 shows that citations accumulated in the first five years since publication are already favorable to top five articles: the median second tier article receives 0.35 as much citations as the median top five one, while the median top field journal receives 0.32. However, it is interesting to note that these differences are smaller for citation accumulated over the first five years since publication than they are for citations accumulated over the first twenty (both the median second tier and the median top field journal article receive 0.24 as much citations as the median top five article). This goes in line with the fact that top five articles have longer life cycles. To better capture this phenomenon, Figure 6 plots the percentage variation between medians calculated for the first five years since publication and for the first twenty.

Figure 6. Percentage Variation between Citations Received During the First Twenty and Five Years since Publication and Total Citations, by Journal Tier

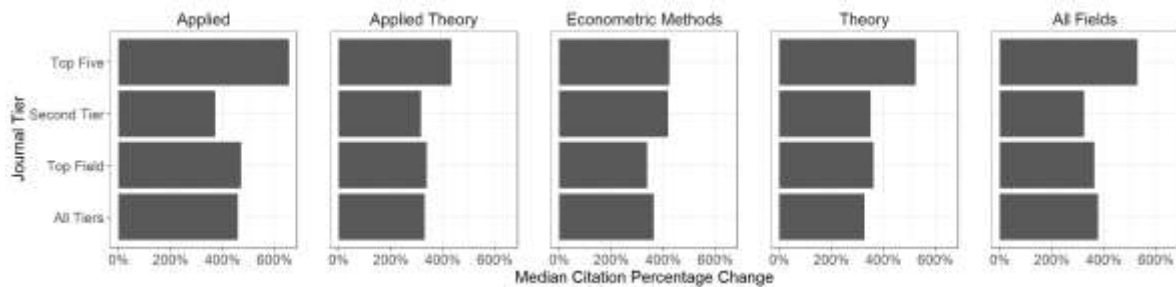


Figure 6 shows that the way in which citations received by articles in the first five years and the first twenty varies across journal tiers is also interacted with fields of economics research. For the case of applied and theory articles, top five papers accumulate even more citations during longer periods. For applied theory articles this pattern is also observed, however less pronounced. Once again, econometric methods articles stand as a special case: the ageing of articles is far more stable across tiers.

Overall, patterns reported when total citations were analyzed remain stable when citations during the first five years since publication are analyzed. However, differences across journal tiers are quantitative smaller; this is due to the fact that top five articles tend to age better (in particular applied and theory articles).

4. Discussion and conclusions

As stated by Gibson (2014), economics is unusual among academic disciplines in the emphasis it places on publication in a narrow set of top journals. Given that publication venue reputation does not necessarily go hand in hand with citation performance, we study how citation patterns differ between three different journal tiers (top five, prestigious second tier, and top field journals).

We show that citation patterns vary greatly across journal tiers, and that this variation is related to fields of economics research. In particular, our analysis suggests a series of clear-cut patterns:

1. Total citations received by a typical (as measured median citations) article published in a top five journal are higher than the ones received by non-top five outlets. In its first twenty years since publication, the median top five article accumulates as many as 4.25 citations when compared to the second tier and top field median article.
2. As expected, for every year since publication yearly citations received by top five journal papers are higher than the ones received by second tier and top field journals papers. In addition, compared to second tier and top field journals' articles, top five journals' articles do not only receive more citations, but also experience a rise in yearly citations for longer periods. In other words, their life cycles are longer.
3. There is a strong overlap in the distribution of received citations across tiers. As an example, for all journals we analyzed, at least one third of their articles received at least as many citations as the 10th percentile of the AER articles' citations.
4. We find that no matter the articles' impact, claims such as the statement that an article in a top five journal should be valued more than five good publications outside these venues may be oversimplifying the problem and overestimating top five journals impact. We find that the tenth less(more) cited top five article receives around 4(3.5) times as many cites as the tenth less(more) cited second tier or top field article.
5. These median ratios are strongly associated with fields of economic research: they are larger for applied theory papers and smaller for econometric methods papers.
6. Additionally, these ratios are also associated to articles' impact within each field of research. For applied articles the gap narrows very mildly as one moves toward high-impact articles, whereas this narrowing is sharp for the case of econometric methods papers (even converging at high values) and applied theory papers (which shows a dramatic narrowing, but not strong enough as to attain convergence). Notably, theory papers show an opposite pattern: the gap widens as one moves toward high-impact papers.
7. Patterns remain stable when citations counts are restricted to the first five years since publication. However, differences across journal tiers are relatively smaller. This is due to the fact that top five articles tend to age better (in particular applied and theory articles) and this exacerbates differences as time passes by.

8. Top field journals in general behave relatively similar to second tier journals in term of citation patterns, being an exception econometric methods articles published in top field outlets whose citations exceed those of second tier journals. These patterns remain quite stable when the JEP and JEL are excluded from the second tier category (although, in this case, a relatively better citation performance is observed for the top field journals).

We believe the clear-cut facts reported in this article help in the understanding of incentives behind the evaluation of research agents in economics (e.g., the direction of research in economics, the career paths of young researchers, the reputation and pay of economics scholars, *inter alia*). Additionally, results suggest that the great emphasis of academic economics on top five journals may be taken with care.

In line with previous research, our results point out that it may be convenient to assign a greater weight in the determination of economic and reputational rewards to factors such as citation counts (as suggested in Hamermesh, 2018) and departmental peer-review of a candidates' work (as suggested in Heckman and Moktan, 2018). However, and we believe importantly, economics is a far from homogenous discipline and these criteria should also be adjusted by fields of economics research factors.

4.1. *Limitations*

A few caveats must be mentioned regarding the scope of our results. First, our results are purely descriptive and should not be interpolated as suggesting that the same paper will receive more citations simply because it was published in a top tier journal relative to a scenario where it was published in a non-top tier prestigious outlet. The dynamics behind citations are quite more complex than this. Take the following example: as economics scholars prioritize publishing in top five journals, competition is stronger in those journals, and selection arises.⁹ For this reason, one would expect stronger and more innovative papers to be published in top five journals, and, as one would also expect stronger papers to be cited more, this should translate into articles published in top five journals having higher citation

⁹ According to Card and DellaVigna (2013), QJE had an acceptance rate of around 3% by 2013, while, according to Cherkashin et al. (2009), the acceptance rate of the Journal of International Economics was around 14% by 2004.

counts. However, for the same reason, one could also expect some top tier papers to be cited more simply because they were published in these venues. Concretely, if authors search more extensively previous literature in top tier journals (something expected if articles published in these journals are believed to be stronger), cites may simply flow toward an article published in these outlets because of their reputation, something an equivalent-in-quality article published in a non-top tier venue may not benefit from.

Second, given that right from the beginning we planned to study differences in yearly citation patterns for long periods, our analysis focuses on articles published more than twenty years ago (and their present day received citations). This means that patterns for present day articles may have changed. In fact, the literature suggests that factors that may affect citations patterns (e.g., acceptance rates) have effectively changed in the last decades (see, for example, Card and DellaVigna, 2013; Cherkashin et al., 2009). Given that evidence points toward competition being stronger in top tier journals, assuming the patterns reported in this article have deepened does not seem to be a longshot.

4.2. Future research directions

This article reports a series of patterns, which we believe, may motivate future research. Clearly, one line of research may focus on studying the origin of these differences. Some work has been carried out in this direction. For example, regarding fields of economics research, recent research suggests that economics empirical papers are much more likely to be cited by other disciplines (e.g., psychology, public health, medicine) than economics theory papers (Angrist and Pischke, 2017).¹⁰ We report that differences in citations patterns across fields economics of research also relates to journals tiers, understanding how other disciplines search for relevant economics articles across economics journals would be of interest (are top five journals more visible than other disciplines?). Future research should focus on analyzing these patterns for using newer articles as input, as patterns may have changed in as time passed by. Additionally, the use of top five journals publications as a signaling mechanism for young scholars is an interesting and relevant research question. This

¹⁰ An alternative explanation could be that standard practice is to list citations for every article which deals on any subject remotely similar to one's own paper and that a much larger number of papers meet this criterion in applied work than in theoretical work.

line of research is far from trivial and should tackle some interesting methodological aspects. For example, it is not easy to identify an author as a young one from traditional sources, it is not clear how to deal with articles with multiple authors, and to obtain some kind of causal estimate of the effects of publishing in a top-five journal in young scholars careers a good identification strategy should be proposed. Finally, patterns characterized in this article could serve as input in the design of future citation metrics.

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Online Appendix

Figure S1. Distribution of Fields of Economics Research across Journals and Journal Tiers

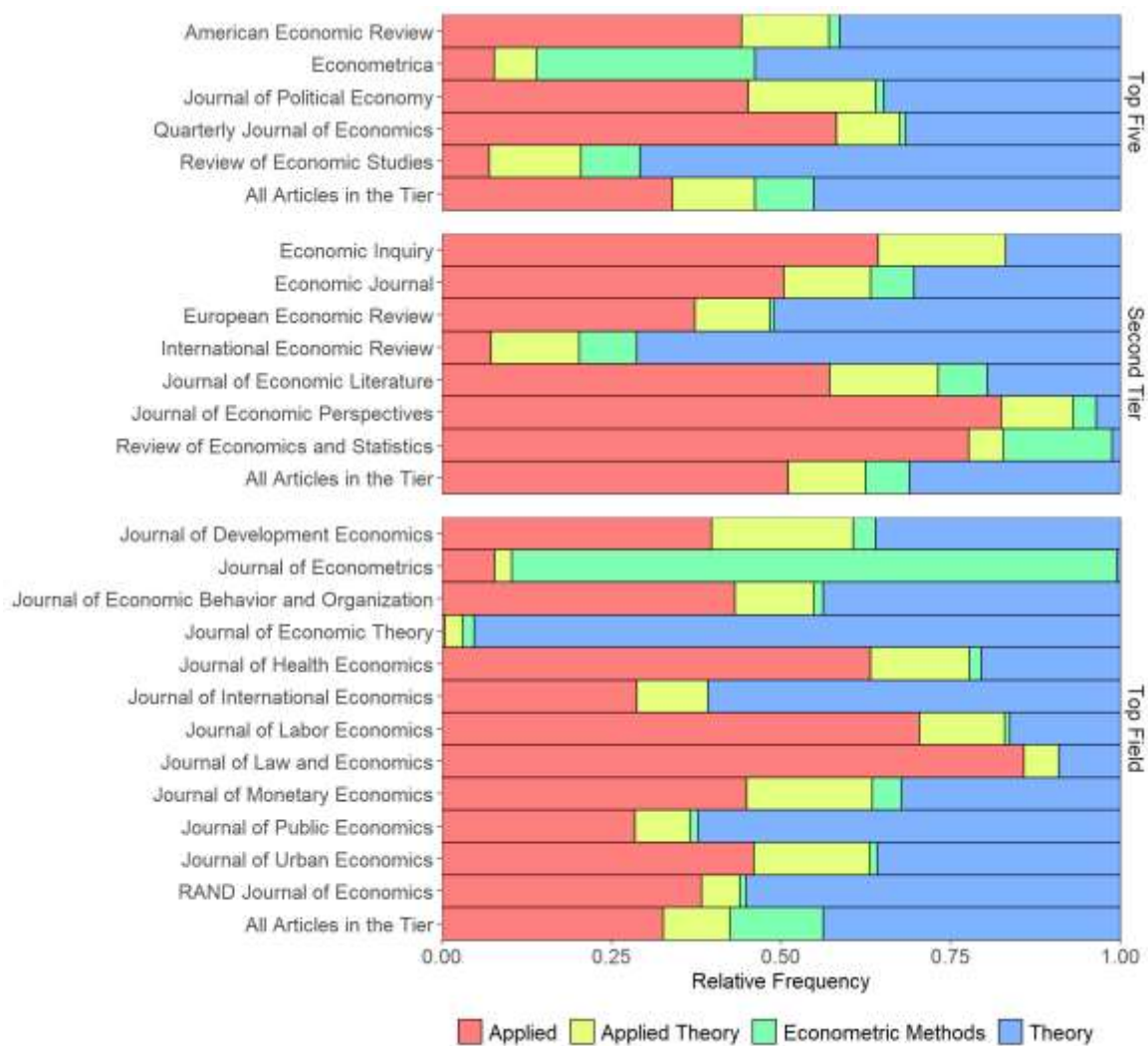


Figure S2. Yearly Mean and Median Citations Received by across Journal Tiers and Fields of Economics Research (Free y-axis)

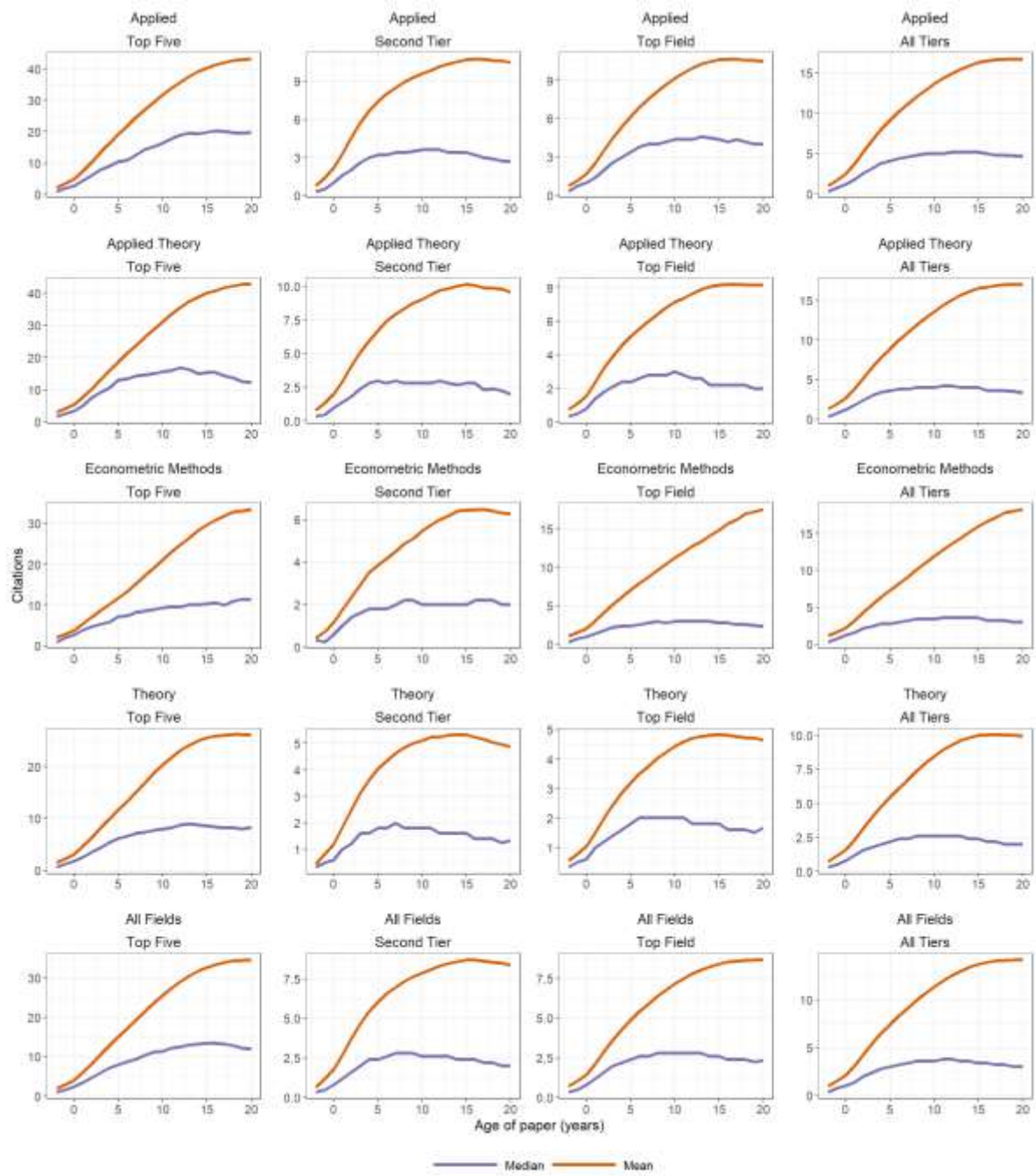


Figure S3. Yearly Mean and Median Citations Received by across Journal Tiers and Fields of Economics Research (Free y-axis), Excluding the JEP and the JEP

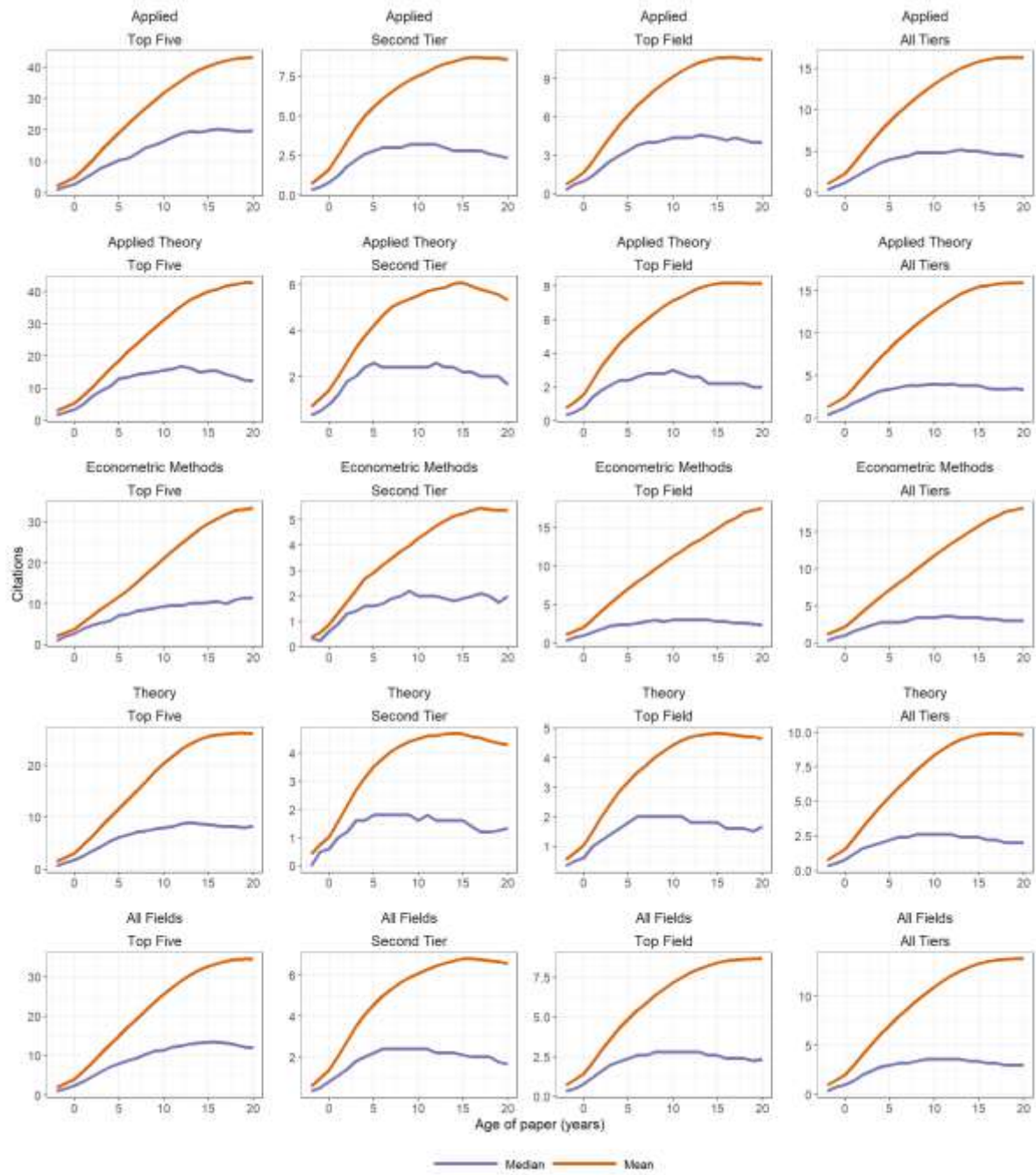
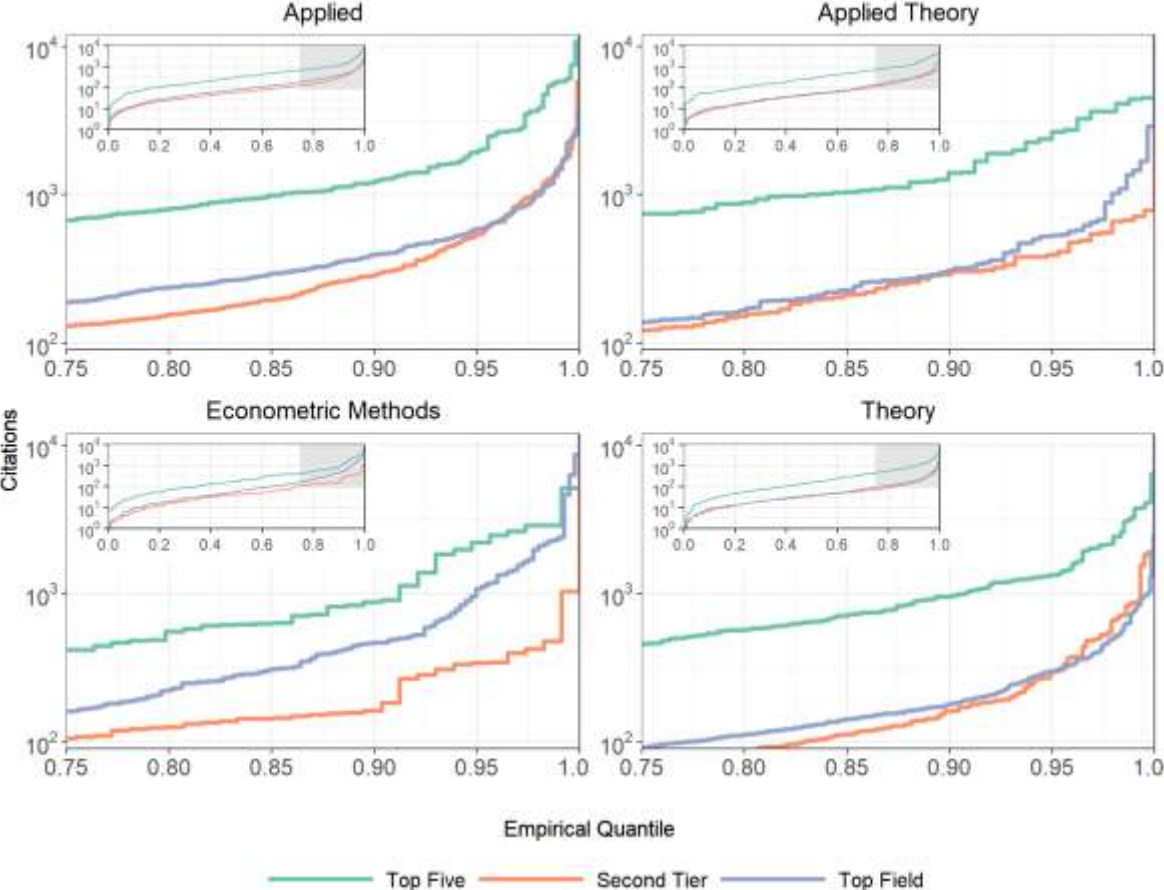


Figure S4. Empirical Quantile Functions of Articles' Total Citations across Journal Tiers and Fields of Economics Research, Excluding the JEP and the JEP



Note: 1 was added to the total citations of each article to avoid dropping articles with no citations when plotting in logarithmic scale.

Figure S5. Percentage Difference of Empirical Quantile Functions of Articles Total Citations across Journal Tiers and Fields of Economics Research, Excluding the JEP and the JEP

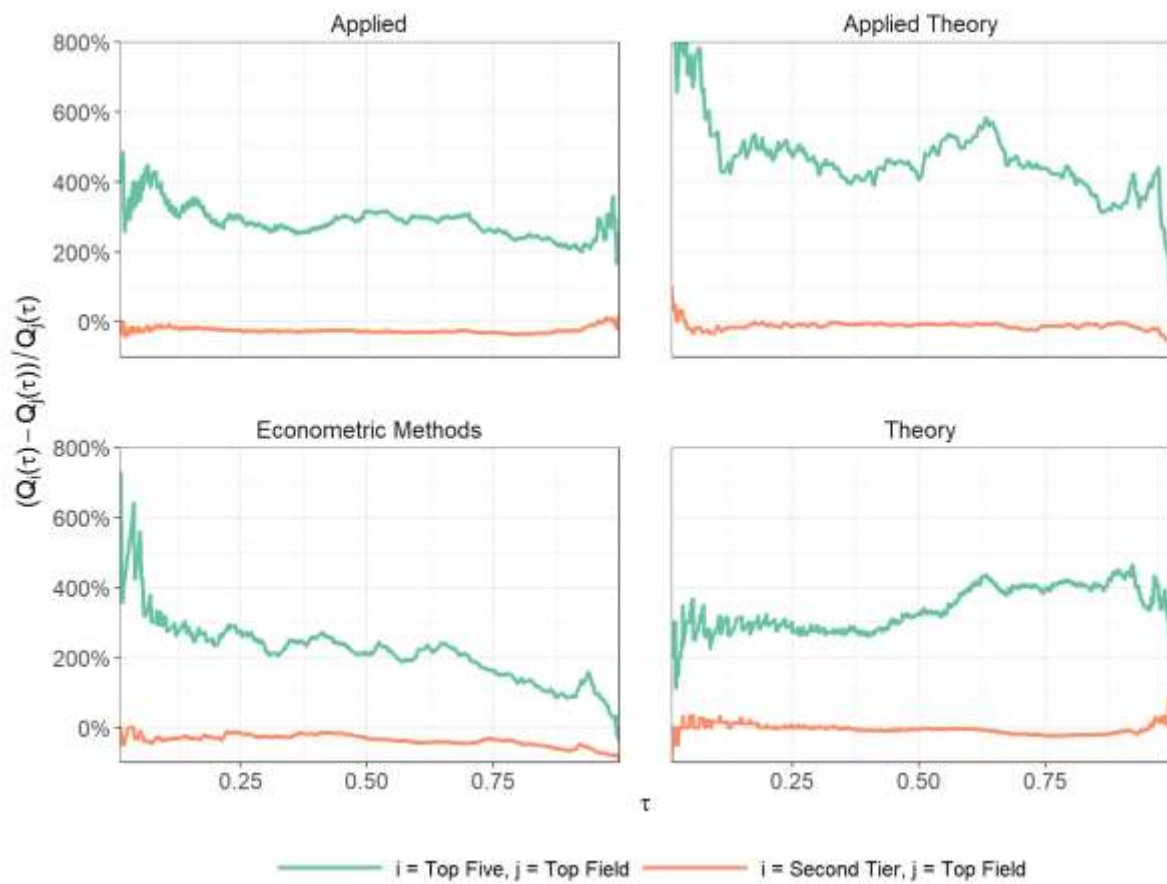


Table S1. Summary Statistics of Total Citation at the Article Level across Journals

Journal	Percentile 0.05	Median	Percentile 0.75	Percentile 0.95	Mean	S.D.	Most cited	Total citations	N° of Articles
American Economic Review	20.00	216.50	571.00	1,416.40	466.79	704.95	5,799	183,917	394
Econometrica	16.00	161.00	396.00	1,893.00	403.45	757.86	6,418	109,336	271
Economic Inquiry	3.90	28.00	59.00	155.30	52.53	75.60	557	11,505	219
Economic Journal	8.00	61.00	125.00	493.70	135.44	241.70	2,037	48,624	359
European Economic Review	4.00	48.00	117.50	524.20	137.88	376.42	5,741	61,633	447
International Economic Review	3.00	31.00	68.00	284.00	75.21	164.53	1,921	19,631	261
Journal of Development Economics	5.00	41.00	122.00	615.80	135.76	254.18	1,786	36,520	269
Journal of Econometrics	3.00	55.00	165.00	901.90	227.47	669.10	8,676	90,762	399
Journal of Economic Behavior and Organization	2.00	26.00	55.25	195.00	61.54	174.31	2,393	18,955	308
Journal of Economic Literature	62.00	475.50	986.00	1,780.50	670.04	639.32	3,387	37,522	56
Journal of Economic Perspectives	17.60	174.50	481.25	1,189.10	386.56	561.96	3,962	44,068	114
Journal of Economic Theory	4.00	36.00	97.75	314.50	85.69	167.97	2,467	35,646	416
Journal of Health Economics	10.80	68.00	145.00	318.20	111.97	127.78	917	13,100	117
Journal of International Economics	6.00	46.00	168.00	620.00	156.98	281.66	2,230	29,983	191
Journal of Labor Economics	14.70	71.00	193.00	457.70	145.69	171.87	928	19,668	135
Journal of Law and Economics	18.00	78.00	172.00	472.30	133.12	147.03	803	13,179	99
Journal of Monetary Economics	7.30	88.00	252.00	803.70	223.30	427.80	3,504	50,690	227
Journal of Political Economy	25.00	309.00	657.00	1,618.00	527.70	700.75	5,427	127,175	241
Journal of Public Economics	5.00	53.00	126.00	288.40	101.52	187.50	2,594	36,038	355
Journal of Urban Economics	5.30	44.00	85.50	200.80	73.55	113.23	1,198	13,754	187
Quarterly Journal of Economics	25.80	404.00	775.00	2,795.60	736.79	1,235.17	10,836	165,777	225
RAND Journal of Economics	16.75	100.00	206.25	542.75	176.76	247.45	2,265	34,644	196
Review of Economic Studies	14.20	145.00	326.00	1,344.40	321.49	516.79	3,262	59,476	185
Review of Economics and Statistics	5.00	54.50	126.50	483.50	125.51	223.25	2,484	51,711	412

Table S2. Summary Statistics of Total Citation at the Article Level across Journals Tiers and Fields of Economics Research, Excluding the JEP and the JEP

Journal Tier	Research Field	5 th Percentile	Median	75 th Percentile	95 th Percentile	Mean	S.D.	Most cited	Total citations	N° of Articles
Top five	Applied	36	332	670.5	1932.9	609.65	1012.69	10836	273122	448
	Applied theory	43.7	266	741.5	2410.9	604.66	851.163	4539	96141	159
	Econometric methods	19.6	178	413.25	2062.05	432.32	734.803	5131	49285	114
	Theory	13.7	156	451.5	1325.4	381.74	623.475	6418	227133	595
	All fields	19	217	573.75	1815.5	490.64	818.352	10836	645681	1316
Second Tier	Applied	6	58.5	129	530.9	142.62	325.659	5741	118088	828
	Applied theory	4	49	121	388	102.1	142.676	785	19501	191
	Econometric methods	2.65	40	104.75	335.8	82.781	130.433	1030	9437	114
	Theory	4	35	70	286.8	81.554	186.714	1921	46078	565
	All fields	4.85	46	107	423.35	113.72	259.833	5741	193104	1698
Top Field	Applied	8	80	187.25	584.5	169.48	289.438	3504	160328	946
	Applied theory	5.25	52.5	137.75	527.25	133.99	269.254	2899	38321	286
	Econometric methods	3	57	159	984.6	228.84	674.222	8676	90848	397
	Theory	3	37	91	298.55	81.45	151.376	2467	103442	1270
	All fields	4	51	131.5	491.2	135.54	330.829	8676	392939	2899
All Tiers	Applied	8	90	235.75	955.95	248.22	560.967	10836	551538	2222
	Applied theory	6	69	226	1008.5	242.08	512.803	4539	153963	636
	Econometric methods	4	65	181	950	239.31	633.001	8676	149570	625
	Theory	4	47	128.75	656.55	155	363.046	6418	376653	2430
	All fields	5	65	179	847.8	208.31	494.873	10836	1231724	5913

Table S3. Detailed Variation Rate of Empirical Quantile Functions of Articles Total Citations across Journal Tiers

Empirical Quantile (τ)	i=Top Five ; j=Second Tier					i=Top Five ; j=Top Field				
	All tiers	Applied	Applied theory	Econometric methods	Theory	All tiers	Applied	Applied theory	Econometric methods	Theory
0.1	2.83	3.67	6.14	4.55	2.29	3.31	3.50	5.42	3.16	2.83
0.2	2.76	3.61	5.13	3.54	2.92	3.00	2.79	4.75	2.35	2.92
0.3	2.88	3.38	3.92	3.05	2.68	2.88	2.73	4.37	2.17	2.89
0.4	2.94	3.32	4.01	3.05	2.87	3.14	2.65	4.28	2.56	2.64
0.5	3.25	4.03	3.93	3.29	3.33	3.25	3.15	4.07	2.12	3.22
0.6	3.84	3.83	4.40	3.78	4.01	3.53	3.00	5.16	2.18	3.97
0.7	3.60	3.74	3.95	2.76	4.97	3.38	3.07	4.50	2.05	4.01
0.8	3.30	3.11	2.80	2.64	5.17	3.19	2.38	4.30	1.33	4.16
0.9	2.31	1.88	2.14	1.85	4.23	2.76	2.08	3.27	0.87	4.35

Note: This table contains values for $(Q_i(\tau) - Q_j(\tau))/Q_j(\tau)$, where $Q_i(\tau)$ stands for the empirical quantile τ of distribution i . In this way, a value of 2 indicates that $Q_i(\tau)$ triples $Q_j(\tau)$.