TI 2020-019/II
Tinbergen Institute Discussion Paper

On the Influence of Top Journals

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On the Influence of Top Journals

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April 9, 2020

Abstract

We study the evolution of the influence of journals over the period 1970-2017. In the early 1970's, a number of journals had similar influence, but by 1995, the 'Top 5' journals – QJE, AER, RES, Econometrica, and JPE – had acquired a major lead. This dominance has remained more or less unchanged since 1995. To place these developments in a broader context, we also study trends in sociology. The trends there have gone the other way – the field journals rose in influence, relative to the Top General journals. A model of journals as platforms is developed to understand these trends across time and across disciplines.

Keywords: research impact, Top 5 journals, academic publishing, citations.
JEL Classification: A14, D85

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We thank Ludo Waltman for comments and for providing data on the number of journals and articles in economics and sociology. We thank Tony To for expert research assistance and thank James Moody, Nizar Allouch and Michael Rose for helpful discussions. We acknowledge comments at the 2019 Network Science and Economics Conference, 2019 Annual Conference of the Royal Economic Society, the 2019 North American Summer Meetings of the Econometric Society, and seminars at CWTS Leiden, Max Planck Institute for Innovation and Competition, Amsterdam, Kent, and York. We are grateful to INET for organizing a special Panel Discussion on Publishing in Economics at the 2019 Annual Conference of the Royal Economic Society.

1 Introduction

One aspect of the organisation of economic research that has attracted a lot of attention is the importance accorded to publications in top journals, in particular to the so-called "Top 5" journals.[1] At many departments, publishing in Top 5 journals appears to be highly correlated with promotion. The editors and the referees of these journals are concentrated in a few leading American departments. This has raised a broader concern about insularity and pressures to conform in the profession. For a discussion of these concerns, see Angrist, Azoulay, Ellison, Hill, and Lu (2020), Fourcade, Ollion, and Algan (2015) and Heckman and Moktan (2020).[2]

This discussion motivates a close examination of the evidence on the quality of journals in economics. Do a few top journals really stand out relative to the others and has it always been the case? Is the dominance of a few general journals a feature specific to economics? If so, what is it about economics that creates this hierarchy?

Judging the quality of research is a complex problem. In our work, we measure quality in terms of citations. While citation offers a particular perspective on quality or the importance of a paper, the big advantage is that data on citations is available for a large set of journals and across a long period of time. Moreover, citation data is also available across disciplines. This allows for systematic comparisons. For a discussion on the uses of citations as a measure of the quality of research, see Hirsch (2005) and Hamermesh (2018).

We start by presenting evidence on the evolution of citations of journals over a period from 1970 until 2017. In particular, following Ellison (2002), we use the ratio of citations between different journals as a measure of the relative influence of journals. As in his paper, we consider three sets of journals

- The Top 5.
- Three general interest journals – Economic Journal, International Economic Review, and Review of Economics and Statistics.
- Well known field journals – Journal of International Economics, Journal of Law and Economics, Journal of Econometrics, Journal of Economic Theory, Journal of Urban Economy, Journal of Monetary Economy, Rand Journal of Economics, Journal of Public Economics, Journal of Law and Economics and Journal of Development Economics.

The influence ratio is computed as the average Impact Factor (hereafter, IF) of field journals

[1] This refers to *American Economic Review, Econometrica, Journal of Political Economy, Review of Economic Studies, and Quarterly Journal of Economics*. Indeed, in a recent paper, a senior economist has used the word "top5itis" to describe the focus of the profession on these journals, see Serrano (2018).

[2] The 2017 AEA Annual Meeting had a panel discussion on this topic: "Publishing and Promotion in Economics: The Curse of the Top Five", which can be viewed at `https://www.aeaweb.org/conference/webcasts/2017`. In this connection, also see Card and DellaVigna (2013) for a careful discussion of trends in publishing in the top 5 journals.

or prominent general interest as a ratio of the average Impact Factor of Top 5.[3] We consider the time series of these ratios from 1975 until 2017.

Figure 1 summarizes our findings. In the early 1970's, Tier 2 general interest journals and Top field journals had an influence that was relatively similar to that of the Top 5 journals. But the difference in influence between the Top 5 journals and other journals grew rapidly over the 1980s and 1990s. By 1995, the influence of Top 5 journals was four to five times the influence of Tier 2 and Top field journals. In the period after 1995, the Tier 2 journals somewhat recovered their standing so that the situation in 2017 was similar to what it was in the mid 1980's. The standing of Top field journals appears to have remained relative stable: the ratio in 2017 is similar to what it was in 1995.

To understand these trends we also examine the evolution of the structure of the citation network among these 17 journals, over time. Figure 4 presents snap shots of the citation structure at four points in time – 1977, 1987, 1997, 2017. These snap shots show that in the 1970's the journals were closely interconnected and all of them had a similar level of 'centrality'. By 1997 this had changed, with a clear separation emerging between the Top 5 and the rest of the journals: the Top 5 were closely interconnected among themselves, the rest of the journals cited the Top 5 but hardly cited any of the other journals. This core-periphery structure became more sharply delineated in the years after 1997.

We develop a model to understand the reasons for these trends. In this model, there is a set of authors spread across research fields. Authors get ideas and they seek to publish in journals that are widely read. There is a journal for every field – that publishes papers from that field only – and there is a general interest journal – that publishes papers from every field. It is assumed that every author reads the journal in his field and that a fraction of authors read the general interest journal. Every journal has a capacity that determines the number of papers it can publish. Journals accept the best papers submitted to them, subject to meeting this capacity.

We show that there are three main forces at work: the number of fields, the readership of the general journal, and the capacity of the journals. If the number of fields times the readership of the general journal is small then the field journal publishes the best quality papers, if it is large then the general journal publishes the best papers. In the intermediate range, there exist multiple equilibria: they include the two equilibria outlined above but there also exist asymmetric

[3] More formally, consider field journals. Fix a year T. Compute the number of citations at T of all articles in these journals that were published in the preceding 5 years, from year $T-5$ until $T-1$. Divide the total citations by the number of articles published over these years. Place the number obtained in the numerator. Similarly, compute the citations at T for articles published in a top 5 journal over the years $T-5$ until $T-1$ and divide the total citations by the number of articles published over this period. This gives us the number of citations normalized by the number of papers. Divide the first number by the second number. This gives us the ratio for year T. We consider the time series of this ratio from 1975 until 2017.

equilibria with different standing of general and field journals across the fields. The capacity of the journals is clearly important. Suppose the equilibrium is one in which the general journal dominates. If capacity in a field journal grows, the journal will be willing to accept a lower quality paper and this will lower the ratio of quality of this journal versus the general journal.

We use the model as a lens through which to view the evolution of economics. We show that through the 1980's and early 1990's there were two major developments. The first development was a significant growth in the scale of economics – in terms of number of journals and papers published. The second development was a standardization of the economics PhD programme and the increasing dominance of the American model of graduate education in economics. The latter was highly correlated with changes in the broader environment of the discipline that shifted markedly in favor of mainstream economics and is best reflected in the prominence of Ronald Reagan and Margaret Thatcher, and in the collapse of communism. This historical moment was perhaps best captured in the 1992 book, *The End of History and the Last Man*, by Francis Fukuyama. In our view these two developments taken together moved the key parameters – number of fields and the readership of the general journal. In line with the predictions of the theory, this in turn led to a rise in status of the Top 5 general journals.

In the period after 1995, the empirical trend in growth of research has persisted over this period. The model suggests that an increase in number of fields will further lower the journal impact ratio of the Top field journals relative to the general journal. This is broadly in line with the empirical trend for the Top Field journals – a small decline in their influence ratio.

By way of a robustness check we examine trends in one other social science: sociology. We consider three top general interest journals – American Journal of Sociology, American Sociological Review, Social Forces – and we consider 6 Top Field journals — Administrative Science Quarterly, Demography, Journal of Health and Social Behavior, Social Networks, Social Psychology Quarterly, Social Science & Medicine. We find that in the period 1975 to 1995, there was an increase in influence of top field journals relative to the top 3 journals. This persisted after 1995. As a result, by 2017, top field journals were on average only slightly less influential as compared to general interest journals. Moreover, particular field journals such as Administrative Science Quarterly or Journal of Health and Social Behaviour were actually more influential than the three general interest journals, for stretches of time. Thus the trends in sociology were quite different as compared to economics.

Our model helps us understand this difference. In the model, other things being equal, an expansion in a field can lead to a higher quality of that field journal, relative to the general journal. We find that there was relatively modest growth in the overall scale of research in

sociology. There also appears to have been no major large scale change in the broader intellectual environment comparable to economics. Indeed, Angrist et al. (2020) and Fourcade et al. (2015) show that economics is relatively more insular as compared to the other social sciences – sociology, political science and anthropology.[4] In particular, Fourcade et al. (2015) have argued that a major distinguishing feature of economics, relative to sociology, is the much stronger cohesion of economics: different fields within sociology are less well integrated – they do not cite each other a great deal more than their citations of non-sociology journals.[5] By contrast, economics journals rarely cite research outside economics. Putting together the lack of a major expansion in sociology with the lack of cohesion, and viewing this through the lens of the model, suggests that as a field grows (possibly due to exogenous reasons), we expect that the top journal in that field will grow in relative importance. This is indeed what we observe throughout the 1970-2017 period.

Our paper is a contribution to the study of research in economics. Notable contributions in this field include Angrist et al. (2020), Bergstrom (2007), Card and DellaVigna (2013), Ellison (2002, 2013), Hamermesh (2013, 2018) and Heckman and Moktan (2020). A major recurring theme is the standing of different journals (especially the Top 5), how that affects the attractiveness of doing research in economics and how that in turn shapes the types of questions that are studied by economists. Our paper provides perhaps the first comprehensive description of the trends in the influence of top economics journals over a period stretching over almost five decades, from 1970 until 2017. We build on the work of Hamermesh (2018) in using citations as a yardstick for quality, and we borrow the relative influence ratio from Ellison (2002). In his work, Ellison (2002) noted that in the 1980s, and the 1990s, Tier 2 general interest journals and field journals had lost influence relative to Top 5 journals. We show that this decline of Tier 2 journals and Top field journals is robust: it persists from 1995 to 2017. Moreover, this dominance and the trends in it are confirmed when we consider a variety of other measures. Moreover, we place this development in a broader context of social science by presenting a study of journal influence of sociology. We find, somewhat surprisingly, that the trends in sociology actually go the other way – leading to a decline in the standing of the top general journals – over a similar period of time. We develop a model of journals as platforms to identify factors that can help account for different trajectories of journal influence across time and across disciplines.

We would like to draw out the relationship with a recent paper by Heckman and Moktan (2020): their work focuses on the importance of top 5 publications in career progression of

[4] Angrist et al. (2020) also show that economics is becoming less insular over time and that it was more outward looking than psychology by 2015.

[5] For a study of co-authorship patterns in sociology that bears on the integration of the discipline, see Moody (2004). For a similar study in economics, see Goyal, van der Leij, and Moraga-González (2006).

economists in top departments in the United States. They argue that this focus on a few top journals is unjustified as a significant ratio of important papers are published in journals outside the Top 5. We complement their cross sectional finding by showing that there is a very strong trend in the dominance of Top 5 and that this dominance was established by the mid 1990's and that it has remained relatively stable after 1995.

Our model of journals as platforms is inspired by the literature on platform competition, influential early contributions include Armstrong (2006) and Rochet and Tirole (2003). Unlike most of the research in this field, we do not focus on the role of 'platforms' in choosing prices. The owners of the platforms play a relatively passive role in our model. Instead, we use the 'platform' to develop intuitions about externalities in two-sided settings – in particular, this allows us to draw out the role of the size of different sides of the market, the capacity of the journal, and the value of different platforms (the readership of the general journal) – in shaping the relative attractiveness of journals. The main contribution of our paper lies in the use we make of this approach to the empirical study of the relative influence of journals.

The rest of the paper is structured as follows. In Section 2 we present the trends in journal influence in economics. In Section 3 we show that the observed trends are robust to the influence measure used. In Section 4 we present a theoretical model of platform competition between journals that helps understanding the trends in journal influence. In Section 5 we repeat the analysis for journals in sociology. Section 6 concludes.

2 Trends in Journal Influence

This section presents the empirical trends on the influence of economic journals. We start with a description of the data sets.

2.1 Data Sources

The citation data comes from Web of Science (hereafter, WoS). WoS is an information system containing more than 20,000 journals, books, and conference proceedings that include over 80 million records of the most relevant journals (Clarivate Analytics 2018).[6]

Following Ellison (2002), we consider 17 highly ranked journals that can be classified into three categories: nine Top Field, the Top 5 journals and three Tier 2 general interest journals. Table 1 presents the journals in each group.[7]

[6] WoS is widely used in economics of science: out of the 45 articles reviewed in Bornmann, Butz, and Wohlrabe (2018), 26 articles used the WoS as the primary source of information.

[7] We also include the new influential journals that appeared in the 2000s, such as the American Economic Journals, Economic Theory, Quantitative Economics and the Journal of the European Economic Association in the robustness section.

We created two data sets on citations. The first data set, hereafter known as the Top-Journals data set, considers all the articles published between 1970 and 2017 in each of the 17 journals.[8] The Top-Journals data set includes all citations from the universe of WoS that each item received every year following its publication date. This data set is considered in Section 2.2.

Table 1: Top Journal Groups

Category	Journals
Top 5	American Economic Review, Econometrica, Journal of Political Economics, Quarterly Journal of Economics, and Review of Economic Studies.
Tier 2	Economic Journal, Review of Economics and Statistics, International Economic Review.
Top Field Journals	Journal of International Economics, Journal of Econometrics, Journal of Economic Theory, Journal of Urban Economy, Journal of Monetary Economy[9], Rand Journal of Economics[10], Journal of Public Economics, Journal of Development Economics, and the Journal of Law and Economics.

The Top-journals data set does not contain information on individual citations, that is, it does not tell us from which articles the citations came from. This led us to create a second data set, hereafter known as the 100-Journals data set. This data set includes information on individual citations on 100 important journals in economics (including the 17 previously mentioned). While it is not the complete universe of relevant journals in economics, the sample is large enough to cover the journals that account for the most significant share of citations that top journals receive. We select the relevant journals from the "Simple Rank" list of "All Years" published by IDEAS/RePEc.[12] The 100-Journals data set includes the complete set of references for each article published in the 100 journals. The list of journals is in Appendix A; the selection of the list was based on a list retrieved from `https://ideas.repec.org/top/` on May 2018. The citation data itself was retrieved from the Web of Science. Thus, this data set allows us to track which journals are citing each of the top journals and in what year they are citing them. We

[8] We excluded "articles" that had the word 'Foreword', 'Note', 'Comment', 'Preface', 'Remarks', 'Reply', 'Proceedings', 'Introduction', 'Fellow', 'Annual meeting', 'In memoriam', 'Untitled', 'Summary' and 'Memories' in the title. This reduced the number of articles from 277,284 to 264,241. This selection did not exclude research articles in 'Papers and Proceedings' issues and these are included in the data set.

[9] Also covers articles in the *Papers and Proceedings* issue. This was done as the official impact factor as published in the *Journal Citation Reports* includes the *Papers and Proceedings* issue as well in its calculations.

[10] This covers its predecessor Carnegie-Rochester Conference Series on Public Policy.

[11] This covers its predecessor Bell Journal of Economics.

[12] IDEAS is a web portal run by the Research Division of the Federal Reserve Bank of St. Louis and uses the RePEc (Reseach Papers in Economics) database to rank economic journals, among other objectives. Dedicated exclusively to economic research, IDEAS currently has over 2,500,000 items of research, and it is therefore considered a focal point for many economists. Due to its large coverage and relevance in economics, IDEAS was considered the main reference to identify the universe of journals.

analyse this data set in Sections 2.3 and 3.

2.2 Journal Influence

Our first measure of influence is the impact factor, first described by Garfield (1955). It is a standard indicator of a journal's influence widely used to rank journals in economics (Liebowitz and Palmer (1984), Laband and Piette (1994), Kalaitzidakis, Mamuneas, and Stengos (2003), and Engemann and Wall (2009)). The p-years impact factor, $IF^p_{i,t}$, of journal i in year t is calculated as

$$IF^p_{i,t} = \frac{\sum_{s=t-p}^{t-1} c_{i,s,t}}{\sum_{s=t-p}^{t-1} n_{i,s}}, \tag{1}$$

where $c_{i,s,t}$ is the number of citations that the articles of journal i published in year s received from articles published in any journal in year t, and $n_{i,s}$ is the number of articles that journal i published in year s. This measure has an intuitive appeal – a journal that gets more citations per article is more influential than a journal that receives fewer citations. Since the late 1970s, Social Science Citation Index (SSCI) has provided a large sample of citation data that facilitates the computation of this measure, see Liebowitz and Palmer (1984).[13]

Following Ellison (2002), we calculate the p-year impact factor ratio ($IFR^p_{i,t}$) of journal i in year t as:

$$IFR^p_{i,t} = \frac{IF^p_{i,t}}{\sum_{j \in Top5} \frac{IF^p_{j,t}}{5}}. \tag{2}$$

This measure allows temporal comparisons of the evolution of the relative influence of journals across time. We consider a 5-year impact factor ratio, the results are robust to 2 and 10-year impact factors.[14]

Using the Top-Journals data set, we calculate the impact factor ratio of our list of journals. Figure 1 presents the evolution of the average impact factor ratio of Tier 2 and Top Field journals relative to Top 5. This figure reveals two interesting trends:

1. A dramatic decline in the impact factor ratio of the Tier 2 and Top Field journals in the period from 1975 until 1995. In particular, the impact factor ratio of Tier 2 to Top 5

[13] The Social Science Citation Index is currently owned by Clarivate Analytics. The calculation of the official Journal Impact Factor as published by Clarivate has a peculiar asymmetry between the numerator and the denominator; the denominator only counts "citable items" (research articles and reviews) whereas the nominator counts all articles (including editorials, obituaries etc.), see Larivière and Sugimoto (2019). We did not follow this peculiarity and considered citable items only in the calculation of $IF^p_{i,t}$, see also Footnote 7.

[14] Ellison (2002) used a slight variation of impact factor in his calculations. His version is defined as $IF^p_{i,t} = \frac{\sum_{s=t-p-1}^{t} c_{i,s,t}}{n^*_{i,p}}$. There are two main differences with the standard definition. First, he considered articles that were published on the reference year. Second, due to the lack of data, he estimated the number of articles published during the t years preceding year p in journal i ($n^*_{i,p}$) based on the growth of articles of American Economic Review. We use the standard definition of Impact Factor, as it is widely reported on websites and journal citation reports.

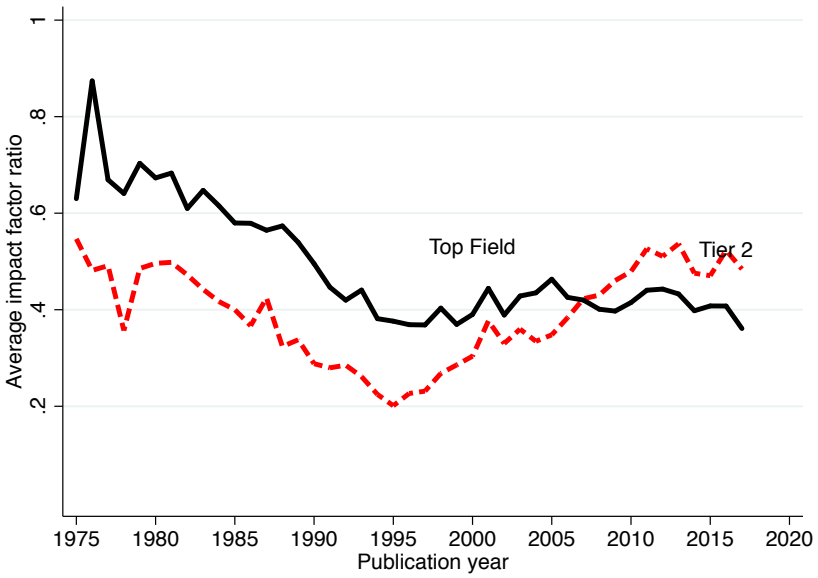


Figure 1: The evolution of the Impact Factor Ratio of the Top Field journals and Tier 2 journals in Economics relative to Top 5 journals.

dropped from 0.55 to 0.20, while that of Top Field to Top 5 declined from 0.63 to 0.38. To get a sense of what this means for the number of citations we note that the average article in a Top 5 journal received around 82% more citations than the average Tier 2 article in 1975. This number went up to 400% by 1995. Articles in Top 5 journals received around 59% more citations than those in Top Field journals in 1980, but they received about 163% more citations in 1999.

2. A partial reversal of these trends for Tier 2 after 2000. By 2017, the impact factor ratio of Tier 2 was 0.48; this difference was comparable to the situation in the early-1980s. In contrast, the influence gap for Top Field journals remains stable after 1995. The upward trends in Tier 2 journals after 1995 are striking and appear to go against the common perception.

The changes in the relative status of journals is nicely summarized in a comparison of the evolution of the Journal of Economic Theory (JET) and Review of Economics and Statistics (ReStat), relative to the American Economic Review. We see here clearly the sharp difference in the fortunes of the Top theory journal and the top Tier 2 empirical journal. In the period 1975-1995, the impact factor ratio of JET and ReSTAT fell sharply. The impact factor ratio of ReSTAT recovered significantly after 1995, while the status of JET declined further.

We turn finally to the impact factor ratio of individual field journals. Prior to 2000, the impact factor ratio of each of the Top field journals decreased. Figure 3 reveals that the impact factor ratios of the field journals have converged by 2000: the impact factor ratio of those fields with

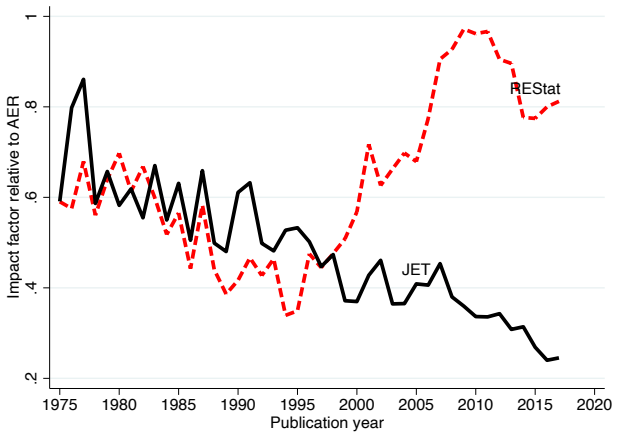


Figure 2: The evolution of the Impact Factor Ratio of the *Journal of Economic Theory* and the *Review of Economic Statistics* relative to the *American Economic Review*.

low impact factors has increased, while the ratio of those fields with initially higher impact factor has decreased. The only exception is the *Journal of Economic Theory*, which has experienced a continuous decline.

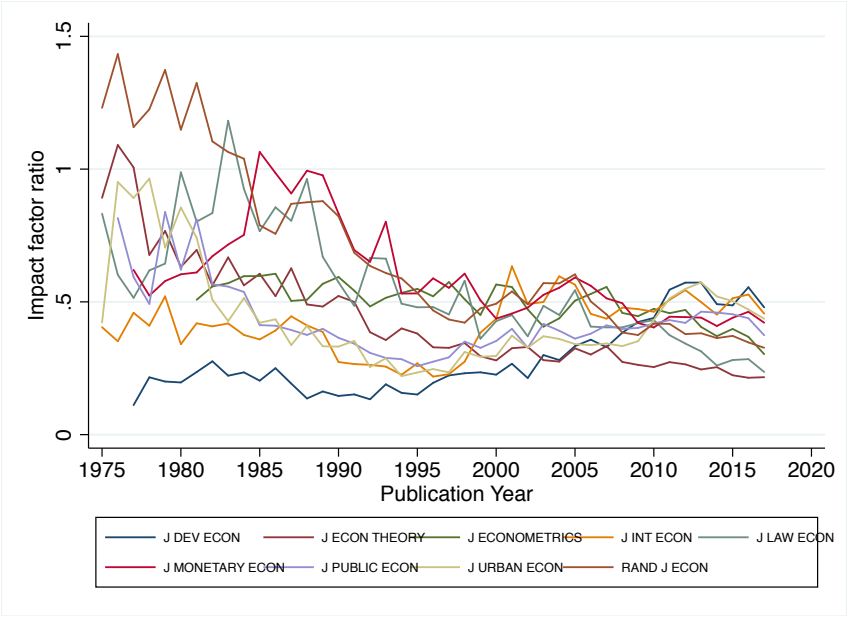


Figure 3: Impact factor ratio per journal

To summarize,

Observation 1. *We identify three trends in the influence of top journals in economics.*

- *Period prior to 1995: starting from a relatively equal level in early 1970's, Top 5 journals demonstrated a sharp increase in their influence and distanced themselves from other top journals.*
- *Period after 1995: Tier 2 journals reduced the influence gap with Top 5 journals, but the*

gap between the Top Field journals and Top 5 remained stable.

- *Over the period 1970-2017: there was convergence in the relative standing of the different field journals.*

2.3 Citation Network

In this section, we investigate more deeply the citations between the top journals in the 100-Journals data set. The data set we created comprises journal to journal citation relations. To be consistent with the time span of the impact factor, we consider only citations between articles that differ at most five years in year of publication. Specifically, we grouped the references of (i.e., citations from) the articles published in a journal j at t to other articles published in our 100-Journals list in $t-4$ to t. Thus, a citing relation between two journals means a reference (citation given) in t to any other publication in the 100-Journals data covering the $t-4$ to t period. We rely on citation networks to illustrate the evolution of journal to journal citations over time. In the citation network, the nodes are individual journals and the edges are values according to the shares of references from the source journal j to the target journal k. The share is obtained as the number of references from journal j to journal k relative to the total number of references from journal j to the other 100-Journals. The citations are directional (edges) because a citation from journal j to journal k differs from a citation from k to j.

Figure 4 presents the evolution of the citation network across time by presenting snapshots for 1977, 1987, 1997, and 2017. Top 5 journals are in red, Tier 2 journals are in green, and the Top Field journals are in blue. To keep the graph as clean as possible, the edges that represent less than 5% of the citations of the journal are not included. The location of a journal in this figure is based on its Article Influence Score (AIS). The AIS takes into account the citations of the papers that cite a particular paper, so it weights the citations recursively (see Section 3 for a formal definition). The journal with the maximum Article Influence Score (AIS) is located in the inner circle; the other journals are located at a distance to the inner circle in proportion to their AIS (relative to the maximum). The middle circle indicates an AIS that is half the maximum, the outer circle indicates an AIS of 0. The first observation is that this figure supports the growing dominance of the Top 5 journals. But the figure offers a more detailed picture of how citations are structured across journals and how that structure has changed over time and how this can account for the rising dominance of the Top 5.

At the start, most of the journals had similar centrality – this is captured by their presence in the central circle. As we move into the 1980's and the 1990's, we see that the Tier 2 and Top Field journals have been pushed out of the central circle while the Top 5 move into the circle and

remain in it for the rest of the period. The figure also brings out one other important feature of the structure of citations: the Top 5 journals have a dense set of connections among themselves, there are very few connections between the field journals, and the field journals cite the Top 5 journals. The situation with Tier 2 is a little more complicated: they are connected to Top 5 journals, have few connections with each other, and are only weakly connected to a couple of Top Field journals each.

This suggests that authors in a field recognize their own top field journal and the Top 5 general interest journals, but there is almost no recognition for research in other fields. This is a key building block for the theoretical model presented in section 4.

We summarize the discussion in:

Observation 2. *The citation network of economic journals reveals that:*

- *In the 1970's, a number of general and field journals were at the centre of the discipline.*
- *In the period leading to 1997, there emerges of a core-periphery structure. The Top 5 journals constitute the core and Tier 2 and Top Field journals constitute the periphery. The Top 5 journals cite each other intensively, the Field and Tier 2 journals cite the Top 5 but do not cite each other at all.*
- *In the period after 1997, the core-periphery structure is further consolidated.*

3 Robustness

This section presents two alternative measures of journal influence – Article Influence Score (a page rank type measure that takes into account the influence of the journal that cites a paper) and the fraction of top cited papers published. We also briefly study the trends in citations of some prominent new journals that have been introduced over the past two decades. These investigations suggest that the principal trends identified in the previous section are robust.

The Impact Factor does not take into account the source of the citations: in other words, it gives the same weight to a citation in a top journal as to a low influential journal. Pinski and Narin (1976) developed an indicator, that is called Influence Weight, which gives more weight to citations from journals that themselves have a high Influence Weight. Formally, for journals $i \in \mathcal{J}$ and $j \in \mathcal{J}$, let c_{ij} be the number of references in journal i that cite journal j, and let $s_i = \sum_j c_{ij}$ be the total number of references in journal i. Then the Influence Weight IW_i of journal i is the solution to

$$IW_i = \sum_{j \in \mathcal{J}} \frac{c_{ji}}{s_j} IW_j, \tag{3}$$

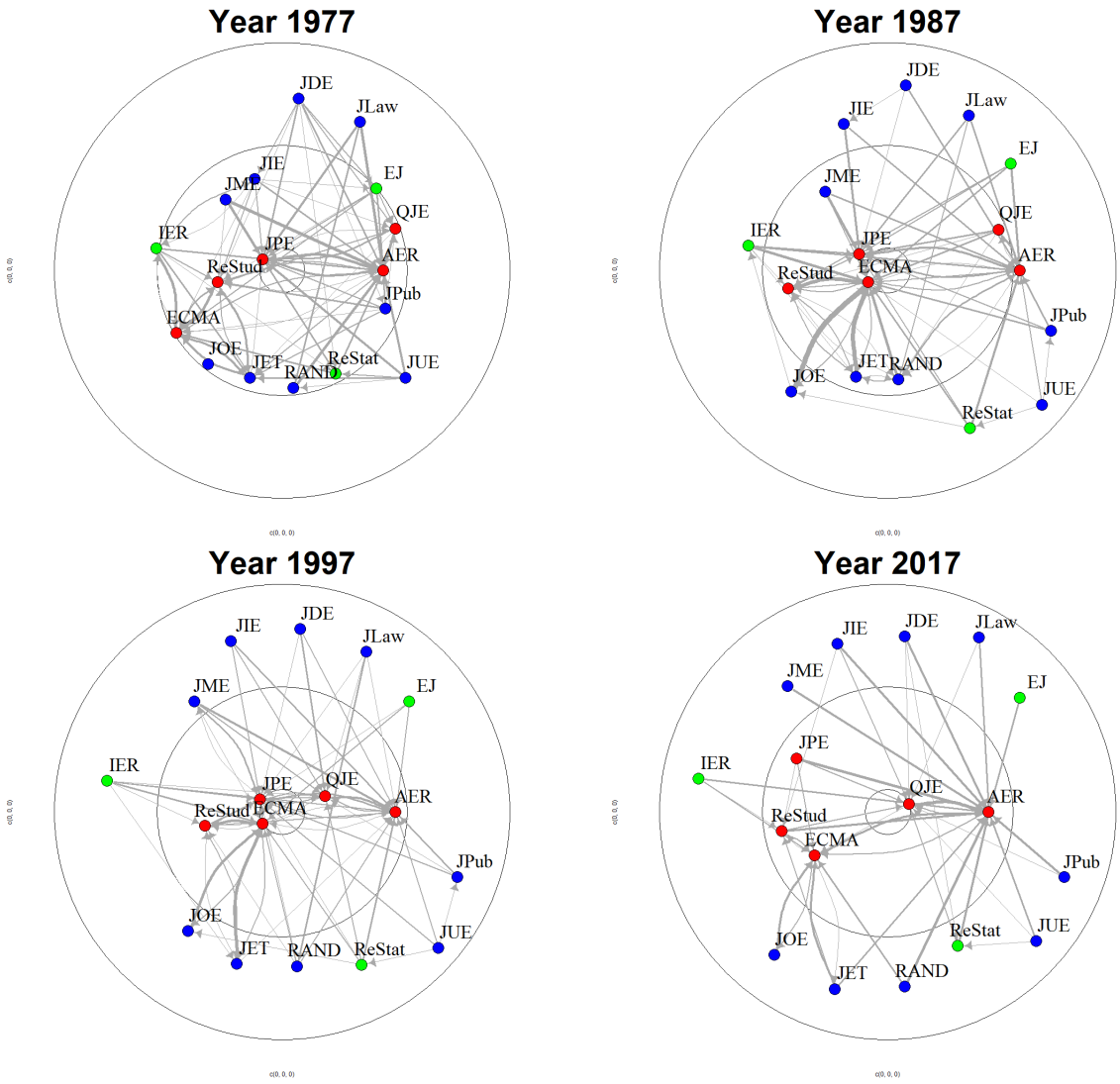


Figure 4: The Emerging Core-Periphery Structure

Note: the journal citation network was calculated for citations between 100 economic journals, see Appendix A for a full list. We show 17 journals in this figure: the five Top 5 journals (red), the three Tier 2 journals (green), and nine Top Field journals (blue) (we have added Journal of Law and Economics to the list of 8 presented earlier). Only citation links that covered at least 5% of the outgoing citations of a journal are shown.

that is, the principal eigenvector of the row-normalized citation matrix

$$C := (\frac{c_{ij}}{s_i})_{i,j\in\mathcal{J}} \tag{4}$$

Normalising this measure by the number of articles a_i of a journal, Pinski and Narin (1976) obtains a measure called Influence Per Publication (IPP), that is,

$$IPP_i = IW_i/a_i. \tag{5}$$

Palacios-Huerta and Volij (2004) provide an axiomatic foundation for this index.

The IPP Index has been implemented in the Article Influence Score (AIS) of the Eigenfactor^{TM} project (Bergstrom, West, and Wiseman (2008)). The AIS omits journal self-citations and ensures that the citation matrix is ergodic, see West and Bergstrom (2008) for details.[15]

We define a citation matrix C, each cell i, j in this matrix refers to the fraction of references in articles published in journal i in year t, that cite articles published in journal j in year $t-5$ to $t-1$. We use the 100-Journals database, as it contains individual citations from article to article. For a discussion of the data sources, see Section 2.1.

Figure 5 shows the trends of the ratio of the average AIS of Tier 2 and Top Field journals relative to the average AIS of the Top 5 journals. The influence gap between Top 5 and other top journals increased before 1995. After that, there was a reversal, though the magnitude of this reversal was relatively modest (as compared to the pattern in the Impact ratio presented in Figure 1). The figure also reveals that the gap between Top 5 and Top Field has continued to widen after 1995. This is contrary to the trend in the Impact Ratio between the Top Field and Top 5 journals after 1995.

As in the case of Impact Ratio, the trend toward convergence across the top Field journals is also observed in the case of AIS after 1995 (see Figure 6).

The two measures we have looked at so far both focus on the 'average' number of citations per paper, which is not a good measure of centrality when the distribution is highly skewed (as is the case for the citation distribution). We now turn to a more complete picture of the distribution of citations. Specifically, we compute the 75th, 90th, 95th and 99th percentile of the distribution of citations received in period t for articles published between $t-5$ and $t-1$.[16] Figure 7 presents the ratio between the citations of Tier 2 and Top 5 journals and Top Field and

[15] West and Bergstrom (2008) define Eigenfactor EF_i as the solution to $EF_i = \alpha \sum_{j\in\mathcal{J}} \frac{c_{ji}}{s_j} EF_j + (1-\alpha)\frac{a_i}{\sum_j a_j}$, as in PageRank Brin and Page (1998). Whereas West and Bergstrom choose the PageRank value of $\alpha = 0.85$, we set $\alpha = 1$, to make it closer to the Influence Weight of Pinski and Narin (1976).

[16] We have also considered the median, but the median citations for Tier 2 was 0 in the 80s and 90s. Results are available upon request.

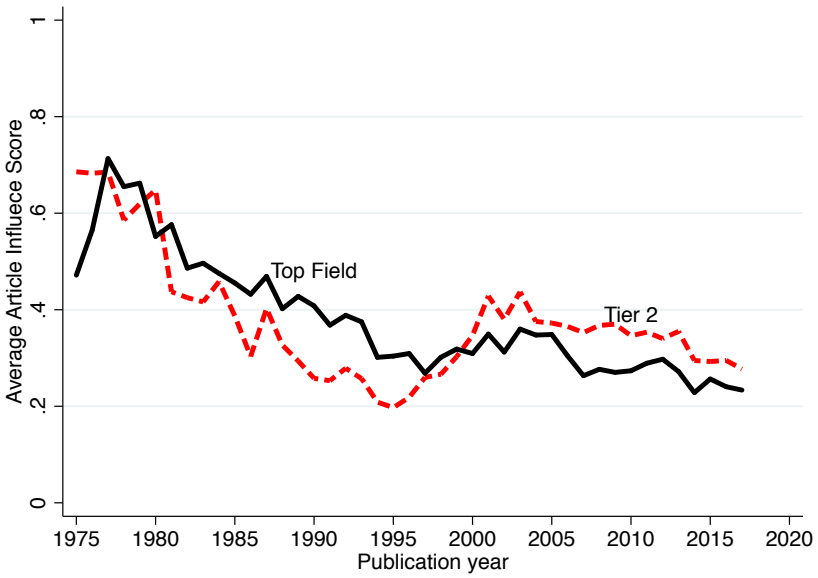


Figure 5: The evolution of the Article Influence Score Ratio of the Top Field journals and Tier 2 journals in Economics relative to Top 5 journals.

Top 5 journals, respectively. We note that the trends are similar to Figure 1.

In an interesting recent paper, Heckman and Moktan (2020) argue that a subject progresses through important papers and examine the location of most cited papers across journals. We build on their idea and define the ratio of most cited papers published in different journals. Our interest is in the trends over time.[17]

We define $c_{a,t}$ as the number of citations that paper a (published in year $s \leq t$) received from any article in year t registered in WoS. Define $n_{i,s}$ as the number of articles published in journal i in year s. We then define the proportion of papers in journal i that are in top 5% of citations distribution at t:

$$IP_{i,t}^{5} = \frac{\sum_{s=t-p}^{t-1}(c_{i,s,t} \geq \bar{c}_{s,t}^{5})}{\sum_{s=t-p}^{t-1} n_{i,s}} \tag{6}$$

where $\bar{c}_{s,t}^{5}$ is 95^{th} percentile of the citation distribution $c_{a,t}$ of all articles published in year s in one of the journals in the 100 journals list. As with the Impact Factor Ratio and the Article Influence Score, we use articles published from $t-5$ to $t-1$, i.e. $p = 5$. $IP_{i,t}^{5}$ can be seen as an estimate of the probability that a random paper published in journal i becomes a top 5% cited paper. Note that if all 100 journals would have the same distribution in terms of citations received, then all journals would have $IP_{i,t}^{5} = 0.05$.

Then, the influence ratio for Tier 2 journals versus Top 5 journals is:

$$IPR_{Tier2}^{5} = \frac{\sum_{i \in Tier2} Z_{i,t}^{5}/3}{\sum_{i \in Top5} Z_{i,t}^{5}/5} \tag{7}$$

[17] We also replicated the Heckman and Moktan (2020) analysis for our data; this is presented in Appendix B.

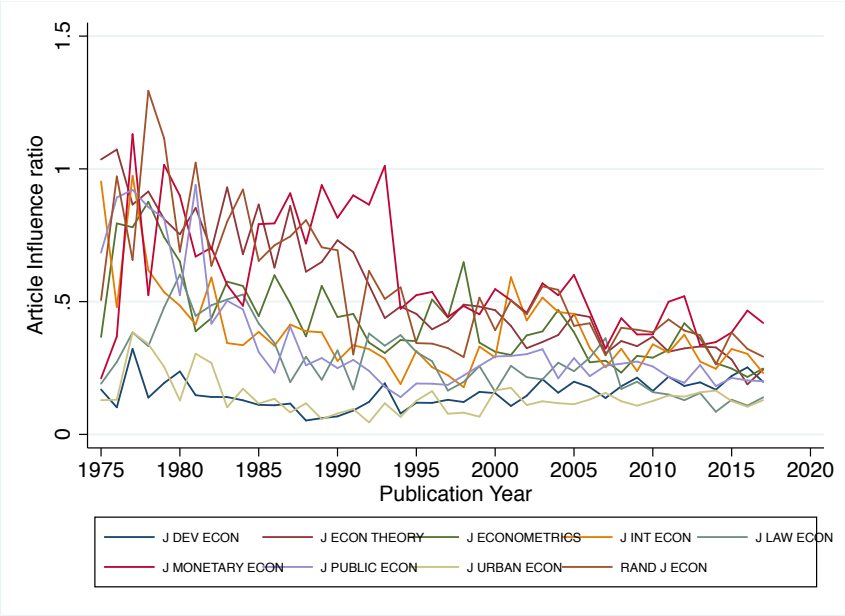


Figure 6: Article Influence Score ratio per journal

Similarly, the influence ratio for Top Field journals is:

$$IPR^5_{TopField} = \frac{\sum_{i \in TopField} Z^5_{i,t}/8}{\sum_{i \in Top5} Z^5_{i,t}/5} \tag{8}$$

Figure 8 shows the IPR-ratios obtained for the 95^{th} percentile using journals in the Top 5, Tier 2 and Top Field group (17 journals).

The trends on ratio of top cited papers are broadly consistent with the trends on impact factor ratio observed in Section 2. There was a steady decline in the fraction of top papers published in the Tier 2 general interest journals and Top field journals, relative to the Top 5 journals, until 1995. After 1995, there has been a significant reversal with regard to the ratio of top cited papers published in the Tier 2 general interest journals. The state of Top field journals relative to Top 5 journals remains more or less unchanged after 1995.

Finally, we present the evolution of impact factor ratio of the new influential economics journals that appeared in the 2000s: American Economic Journals (Microeconomics, Macroeconomics and Applied Economics), Theoretical Economics, Quantitative Economics and the Journal of the European Economic Association. Figure 9a shows that the influence of the new journals increased substantially from 2008 to 2017, the average impact factor of the new journals relative to the average Top 5 increased from 0.20 in 2008 to 0.48 in 2016. Two journals contributed to this upward trend (see Figure 9b), the Journal of the European Economic Association and the American Economic Journals Applied-Economics, both journals present an upward trend in contrast to the downward trend of the historical Top Field during the same period. The Journal of the

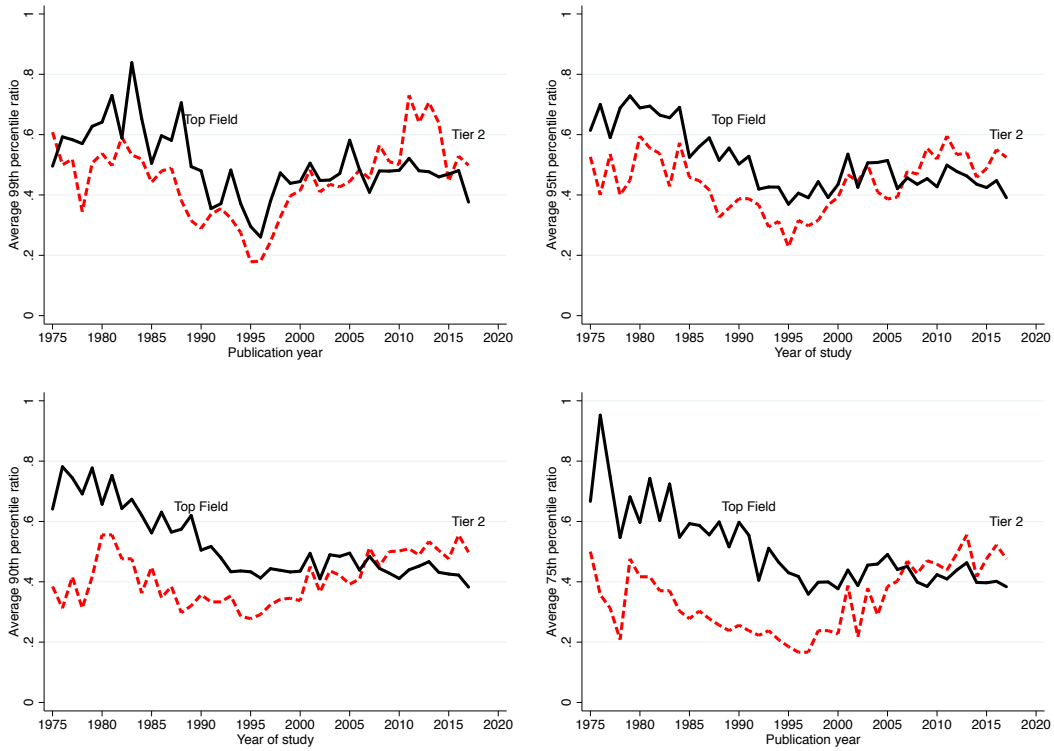


Figure 7: Ratio of Percentiles

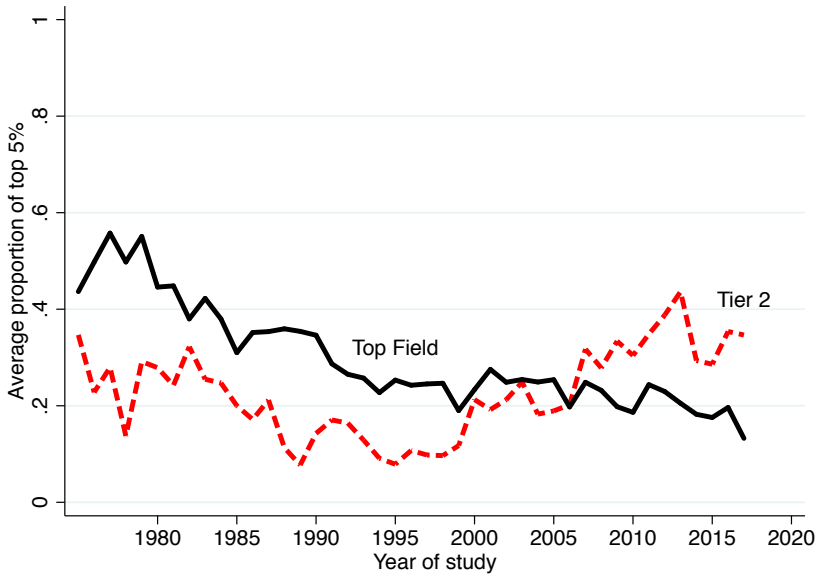
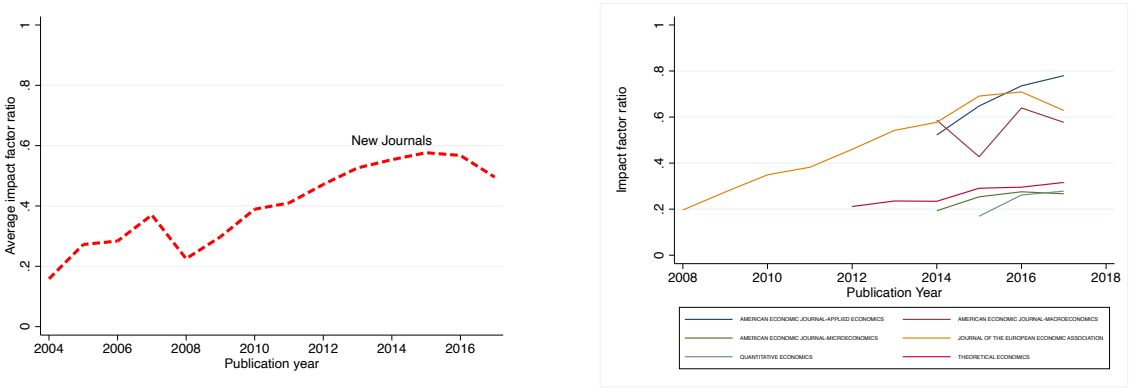


Figure 8: Fraction of Important Papers

European Economic Association increased its impact factor ratio from 0.19 in 2008 to 0.70 in 2016. The influence of the AEJ-Applied Economics also increased relative to the average Top 5 from 0.52 in 2014 to 0.78 in 2017.



(a) Influence Gap

(b) Impact factor ratio per journal

Figure 9: Journals appearing in 2000s

4 A model of journals as platforms

There are $\mathscr{F} = \{1, 2, \ldots, F\}$ fields of research. For each field $f \in \mathscr{F}$, there is a single journal f, and a continuum of authors of measure $n_f > 0$ (also referred to as the field size). The authors are also the readers of the papers published in journal f. In addition, there is a general interest journal g that attracts readers from all fields. In particular, we assume that in field $f \in \mathscr{F}$ a fraction $\alpha_f \in (0, 1]$ of the mass of authors reads the general journal; hence, the readership of the general journal is $n_g = \sum_{f \in \mathscr{F}} \alpha_f n_f$.

Every author i is endowed with an original idea of value $v_i \in \mathbb{R}_+$. The density of authors working in field f with an idea of value v_i is $n_f h(v_i)$, where $h(v_i)$ is a probability density function, the same in every field. The cumulative distribution function associated with $h(v)$ is denoted by $H(v)$. We assume that $h(v)$ is positive for every $v \in \mathbb{R}_+$. Authors use their idea to write a paper. The value of the idea is the same as the quality of the paper. Every author can choose to submit their paper to either their own field journal, the general journal or not to submit it at all.

A journal $j \in \mathscr{F} \cup \{g\}$ has a capacity: it can publish at most a mass of κ_j articles, where $\kappa_f + \kappa_g < n_f$, $\forall f \in \mathscr{F}$. In other words, the number of authors in any field is greater than the combined publication capacity of the field journal and the general interest journal. Journal capacity is exogenous. The journal accepts the highest quality submissions until capacity is satiated.

Authors in all fields simultaneously decide to which journal they wish to submit their paper: the field journal f, the general interest journal g, or not to publish at all. The strategy of an author in field f with an idea of quality v, is a function $d_f(v) \in \{f, g, \emptyset\}$ where $d_f(v) = \emptyset$ refers to 'not publish'. The strategy profile of authors, $d : \mathbb{R}_+ \to \{f, g, \emptyset\}^F$ is the vector function $d(v) = (d_1(v), \ldots, d_F(v))$.

Upon receiving a papers, the editor of journal j can observe the quality of papers. The editor accepts the best papers subject to the journal capacity constraint. This implies that each field journal has a threshold

$$t_f := t_f(d) = \inf \left\{ w \in \mathbb{R}_+ \;\middle|\; n_f \int_w^\infty \mathbb{1}_{d_f(v)=f} h(v)dv \leq \kappa_f \right\} \tag{9}$$

such that journal f accepts a submission with idea value v if and only if $v \geq t_f$. Similarly, the general journal has a threshold

$$t_g := t_g(d) = \inf \left\{ w \in \mathbb{R}_+ \;\middle|\; \sum_{f \in \mathcal{F}} n_f \int_w^\infty \mathbb{1}_{d_f(v)=g} h(v)dv \leq \kappa_g \right\} \tag{10}$$

and accepts submissions with idea $v \geq t_g$. We shall denote by $t := (t_1, \ldots, t_F, t_g)$ the vector of thresholds of the journals.

A journal submission decision rule $d : \mathbb{R}_+ \to \{f, g, \emptyset\}^F$ yields, for each field journal $f \in \mathscr{F}$, the expected quality of papers:

$$A_f(d) = \frac{n_f \int_{t_f(d)}^\infty \mathbb{1}_{d_f(v)=f}\ vh(v)dv}{n_f \int_{t_f(d)}^\infty \mathbb{1}_{d_f(v)=f} h(v)dv} \tag{11}$$

Similarly, the expected quality of papers in a general journal is

$$A_g(d) = \frac{\sum_{f \in \mathcal{F}} n_f \int_{t_g(d)}^\infty \mathbb{1}_{d_f(v)=g}\ vh(v)dv}{\sum_{f \in \mathcal{F}} n_f \int_{t_g(d)}^\infty \mathbb{1}_{d_f(v)=g} h(v)dv}. \tag{12}$$

The utility from publishing in a journal is a function of its quality of a journal and its readership. Authors prefer journals that are read by more authors as their ideas can then have greater impact. The readership of the general journal is

$$n_g = \sum_{f \in \mathscr{F}} \alpha_f n_f \tag{13}$$

whereas the readership of a field journal is n_f. The parameter α_f reflects the importance that authors within a field places on the general journal. It is an important parameter in our analysis.

Authors also care about the expected quality of the papers published in the journal. The utility of submitting a paper of quality v_i to field journal $f \in \mathscr{F}$ is:

$$U_f(v_i|d) = \begin{cases} n_f A_f(d) & \text{if } v_i \geq t_f(d) \\ -1 & \text{otherwise.} \end{cases} \tag{14}$$

Similarly, the utility of submitting a paper to general journal g is:

$$U_g(v_i|d) = \begin{cases} n_g A_g(d) & \text{if } v_i \geq t_g(d) \\ -1 & \text{otherwise.} \end{cases} \tag{15}$$

Hence, for both field and general interest journals, the utility is the product of the readership of the journal and the expected quality of its papers. The utility of not publishing is: $U_\emptyset(v_i) = 0$. As rejection leads to a payoff of -1, authors only submit to a journal if they are assured of publication.

The author's utility maximisation problem is

$$\max_{j \in \{f,g,\emptyset\}} \quad U_j(v_i|d), \tag{16}$$

The corresponding reaction function is

$$p_f(v_i|d) = \quad \underset{j \in \{f,g,\emptyset\}}{\text{argmax}} \quad U_j(v_i|d) \tag{17}$$

Authors use the following tie-breaking rule in case of equal utilities: their first preference is to publish in their own field journal, their second preference is to publish in a general interest journal, and their least preferred alternative is not to publish at all.

Summarising, journals are platforms connecting authors and readers. The reader side is kept relatively simple (a field journal is read by a single field, and the general interest journal is read by a fraction of all fields). The author side is modelled more explicitly. The decision by an author to submit to a journal creates an externality on other authors. This is typical of models of platform competition. However, the nature of the externality is somewhat different and depends on the quality of the user's product, that is, users with high quality ideas impose a *positive* externality on the other platform users, and users with low quality ideas (lower than the platform average) impose a *negative* externality on the other platform users.

A (Nash) equilibrium is an author strategy profile $d : \mathbb{R}_+ \to \{f, g, \emptyset\}^F$, such that $\forall f \in \mathscr{F}$, $\forall v \in \mathbb{R}_+$:

$$d_f(v) = p_f(v)$$

Observe that the payoff from publishing in field journal f versus the general journal g is the same for all authors (within the same field), and this utility is higher than not publishing at all. Given our assumption that for all fields $f \in \mathcal{F}$, $\kappa_f + \kappa_g < n_f$, this means that the journal capacity constraint must be binding. So it is the case that in every field $f \in \mathscr{F}$ a mass of κ_f authors submit their paper to the field journal f, and across all fields, the total measure of submissions

to the general journal equals κ_g, i.e.,

$$\sum_{f \in \mathcal{F}} n_f \int_{t_g(d)}^{\infty} \mathbb{1}_{d_f(v)=g} h(v) dv = \kappa_g \tag{18}$$

It follows that the authors with the best ideas submit their paper to their field journal or the general journal, while the authors with the worst ideas in every field do not submit their paper at all.

In principle, for any field, there are four possible decision rules.

1. An author with quality $v < t_f$ submits to no journal, quality $t_f \leq v < t_g$ submits to a field journal, and quality $v \geq t_g$ submits to the general journal. For this to be optimal it must be that $n_f A_f(d) < n_g A_g(d)$, or equivalently,

$$\frac{A_f(d)}{A_g(d)} < \frac{n_g}{n_f}. \tag{19}$$

2. An author with quality $v < t_g$ submits to no journal, quality $t_g \leq v < t_f$ submits to the general journal, and $v \geq t_f$ submit to the field journal. For this to be optimal it must be that $n_f A_f(d) \geq n_g A_g(d)$, or equivalently,

$$\frac{A_f(d)}{A_g(d)} \geq \frac{n_g}{n_f}. \tag{20}$$

3. An author with quality $v < t_f$ submits to no journal, and quality $v \geq t_f$ submits to a field journal. No one submits to the general journal. For this to be optimal it must be that $n_f A_f(d) \geq n_g A_g(d)$.
4. An author with quality $v < t_g$ submits to no journal, and quality $v \geq t_g$ submits to the general journal. This decision rule is never optimal since $\kappa_f + \kappa_g < n_f$. So authors with quality $v < t_g$ have an incentive to deviate and submit to the field journal.

We plot the three feasible decision rules in Figure 10.

To summarize: any equilibrium involves a combination of decision rules I, II and III and the capacity constraint is binding for all the field journals and the general journal. This sets the stage for a characterization of the circumstances under which different types of equilibrium can arise.

For expositional simplicity, suppose that all fields are equal sized, $\forall f \in \mathscr{F} : n_f = n$, the capacity of the field journals is equal, $\forall f \in \mathscr{F} : \kappa_f = \kappa$, and the fraction of general journal readership is the same across fields, $\forall f \in \mathscr{F} : \alpha_f = \alpha$. With these restrictions in place, we are ready to state our main result.

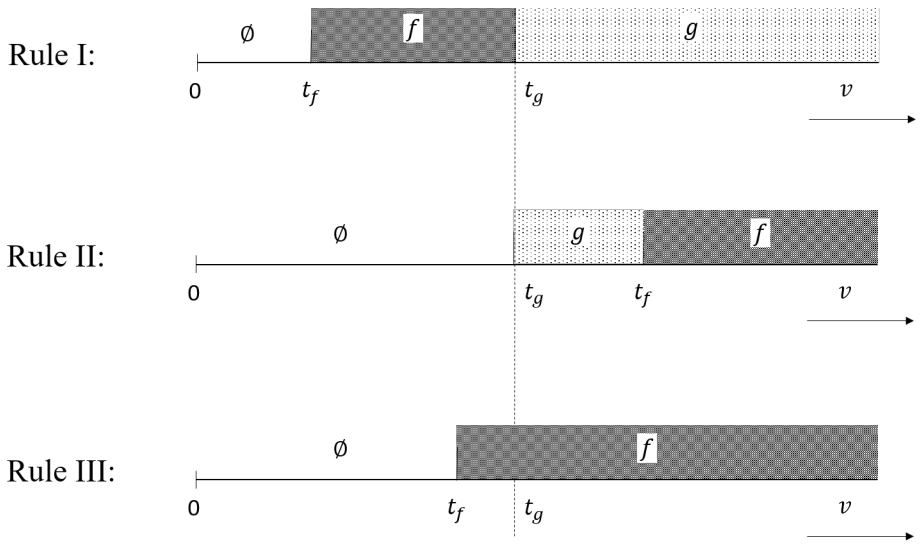


Figure 10: Three possible cases of author submission rules in equilibrium

Proposition 1. *Suppose that* $\forall f \in \mathscr{F} : n_f = n, \kappa_f = \kappa$, *and* $\alpha_f = \alpha$. *There exist numbers* K_1 *and* K_2, *with* $K_1 < 1 < K_2$, *such that the following is true.*

1. *If* $\alpha F \leq K_1$, *the unique equilibrium involves every field using decision rule II. The journal impact ratio is* K_2.
2. *If* $\alpha F > K_2$, *the unique equilibrium involves every field using decision rule I. The journal impact ratio is given by* $\tilde{A}_f(F)/\tilde{A}_g(F)$.
3. *If* $K_1 < \alpha F \leq K_2$, *in addition to the outcomes mentioned above, equilibrium may exhibit hybrid outcomes, with authors in some fields using decision rule I, while authors in other fields use decision rule II or III.*

The proof is presented in Appendix C.

To develop a sense for the way in which the key parameters shape equilibrium outcomes we work through an example.

Example 1.

There are three parameters, number of fields (F), field size (n_f), journal capacity (κ), and readership for the general interest journal (α). Suppose that each field has $n_f = 100$ authors. The quality of ideas in each field is has exponential distribution, $h(x) = e^{-x}$, with average quality $\lambda = 1$. The readership share of the general interest journal is $\alpha_f = 0.05$, independently of the field. All journals j (field and general interest) have a publication capacity of $\kappa_j = 20$.

We develop the relation between the number of fields and the influence ratios with the help

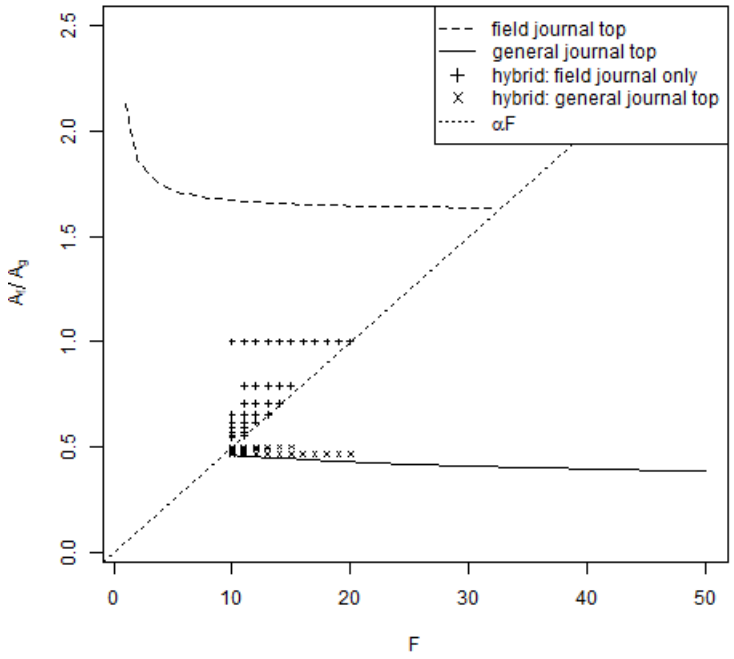


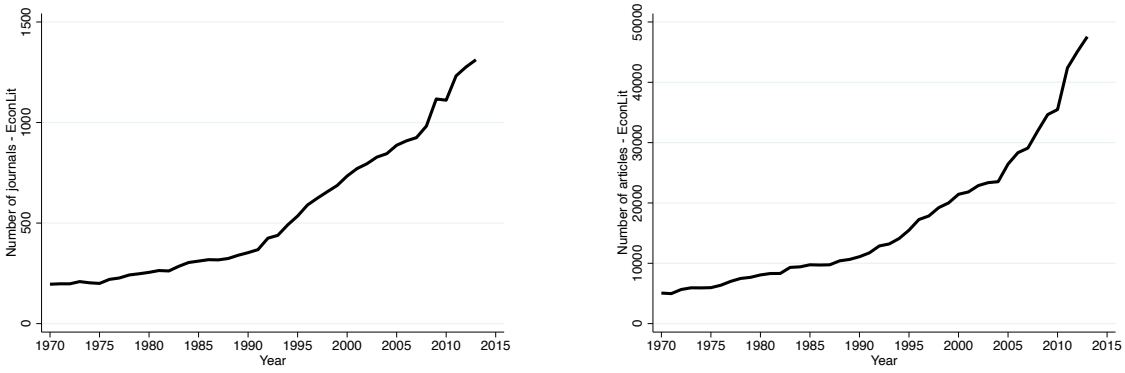
Figure 11: Journal Influence Ratio and Number of Fields

of Figure 11. For $F < 10$ there is a unique equilibrium in which the field journal is the preferred journal in all fields: the journal influence ratio $A_f(d)/A_g(d)$ is larger than 1.6. For $F > 32$, there is a unique equilibrium in which the general journal is preferred in all fields. The journal influence ratio is below 0.5 and slightly decreasing in F. Between $F = 10$ and $F = 32$, there are multiple equilibria. For $F \in (21, 32)$, the two equilibria described above are the only two equilibria. For $F \in (10, 20)$, there are also hybrid equilibria that combine decision rules I and III. In these equilibria, the journal influence ratio for fields in which the general journal is preferred is illustrated with 'x', whereas the journal influence ratio for fields in which the field journal is preferred are illustrated with '+'. We observe that the number of hybrid equilibria decreases with F. In fact, for $F \in (16, 20)$, there are only three equilibria, the two 'pure' equilibria and one hybrid equilibrium (in which the general journal is preferred in one field and absent in the remaining $F - 1$ fields).

4.1 Using theory to understand the empirical trends

This section uses the theoretical model to develop an understanding of the forces that led to the dominance of the Top 5 journals in the 1970-1995 period and the relative stability of this dominance in the period since 1995.

The analysis, as summarized in the Proposition 1 and the example, draws attention to the key role of the number of journals and the readership of the general journal. In particular, both



(a) Number of Journals

(b) Number of Articles

Figure 12: Growth of Economics: 1970-2013. Source: EconLit

these factors push toward a greater dominance of the general journal.

Turning to the empirical context in economics, note that in the 1980's and early 1990's there were two major and interrelated developments. The first development was a significant growth in economics – in terms of number of journals and papers published. Figure 12 presents data on the number of journals listed in EconLit and the number of articles published in those journals every year.[18] The growth in the number of journals is very large – from 196 journals in 1970 to over 500 in 1995, and further on to 1312 in 2013. The number of articles also increased massively, from 5066 in 1970 to 15000 in 1995, and further on to 47556 in 2013. It is useful to think of this growth as arising out of both the increase in number of journals and an increase in number of authors within a field.

The second development was a standardization of PhD programmes, with an increasing dominance of top US schools at the global level. This was highly correlated with changes in the broader intellectual and cultural environment, that shifted markedly in favor of mainstream economics due to the rise of leadership of Ronald Reagan and Margaret Thatcher, and the collapse of communism; for an influential exposition of this development, see Fukuyama (1992). We interpret this as an increase in the readership of the general journal.

Proposition 1 draws attention the role of an increase in the number of journals and readership of the general journal. It shows that these trends will push toward the equilibrium with a dominant general journal. This is consistent with the empirical trends in journal influence until 1995.

Consider next the period after 1995, the Top Field journals ratio remained fairly stable (possibly with a slight decline). The example suggests that, once we are in the general journal

[18] EconLit is a bibliography of economics journals compiled by the editors of the Journal of Economic Literature. We consider EconLit to illustrate the growth of the discipline, instead of the WoS because EconLit shows the evolution of practically the entire discipline while the coverage of journals listed in the WoS mainly increase in the mid 2000s.

dominated space, further increases in number of fields has a small effect on the ratio, see Figure 10. This tendency has probably been reinforced by the growth in the number of leading field journals. To get an impression of the growth in field journals, we present evidence on new journals after 1985, for some leading fields of economics (they are all drawn from our list of 100 journals used to construct the citation data set).

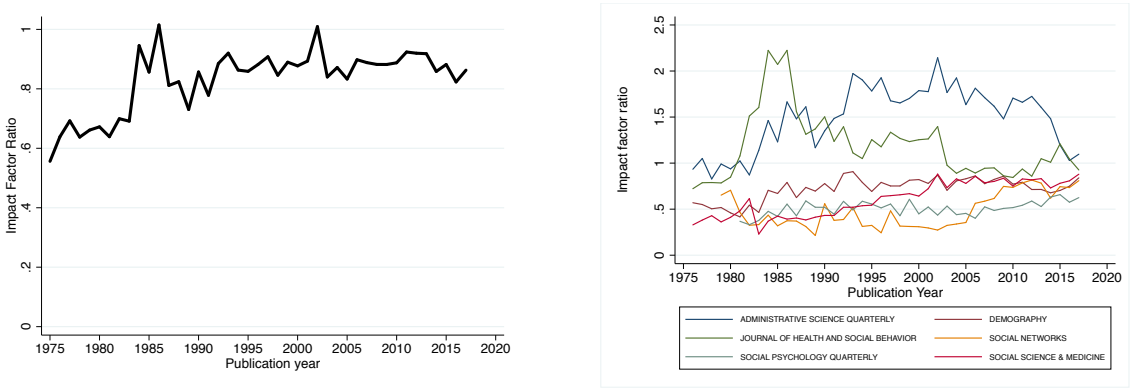
- Economic Theory: Games and Economic Behaviour (1989), Economic Theory (1991), American Economic Journal– Microeconomics (2009), Theoretical Economics (2006).
- Macroeconomics: Review of Economic Dynamics (2001), American Economic Journal-Macroeconomics (2009).
- Econometrics: Econometric Theory (1988), Journal of Applied Econometrics (1987), Empirical Economics (2002),Quantitative Economics (2006),
- International Trade: , Review of International Economics (1992), Review of World Economics (2003).
- Development: Journal of Population Economics (1992), Journal of Economic Growth (1996), Journal of Economic Geography (2002).

Turning, finally, to the Tier 2 journals after 1995, the main observation is that the journal influence ratio recovered. The model does not explicitly consider Tier 2 general journals, but we believe that the discussion on field journals is helpful to understand this recovery. The number of Tier 2 journals remained constant until fairly recently (see the discussion of Quantitative Economics and Theoretical Economics, in Section 3). As the size of the profession expanded, we expect that the number of good papers increased. Card and DellaVigna (2013) have shown that the capacity of Top 5 journals declined over this period. Taking these factors together, we would expect that (under suitable conditions on the distribution of ideas), high quality papers would be unable to publish in Top 5 and be pushed toward the Tier 2 journals This could make the Tier 2 more similar to Top 5 journals, and help explain the significant revival of the leading empirical journal – Review of Economics and Statistics – in this period.

5 Sociology

To locate these developments in economics in a broader context, we study citations in another social science: sociology.

We consider three top General Journals – American Journal of Sociology, American Sociological Review, Social Forces – and 6 top field journals – Administrative Science Quarterly, Demography, Journal of Health and Social Behavior, Social Networks, Social Psychology Quarterly, Social Science & Medicine over the period 1970-2017. The total number of articles is 46272.



(a) Field versus General Journal

(b) Individual Field Journals

Figure 13: Journal Influence in Sociology

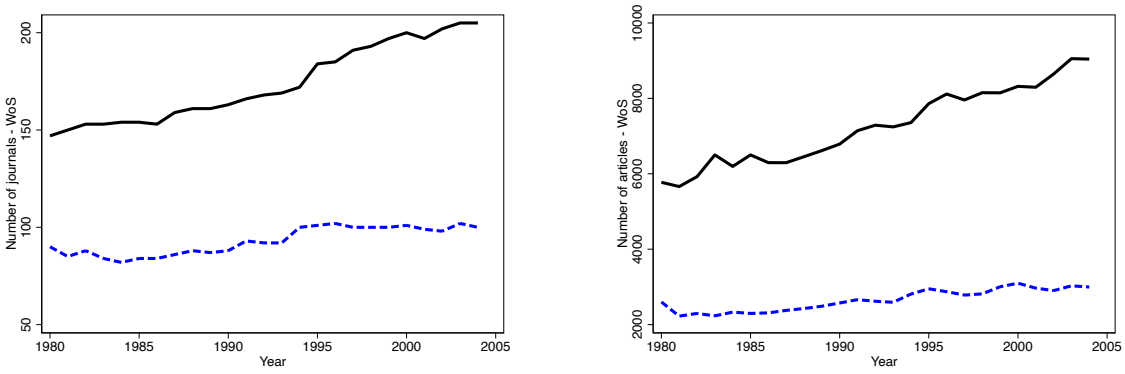
The data on citation counts and references is taken from the WoS. We first present in Figure 13a the evolution of the average impact factor ratio of Top Field journals relative to the Top 3 generalist journals. We find that in the period 1975 to 1995, there was a trend of increase in influence of top field journals relative to the top 3 journals, the impact factor ratio increased from 0.56 in 1975 to 0.86 in 1995 and then it remained relatively stable till 2017. As a result, by 2017, top field journals were on average almost as influential as general interest journals. Figure 13b shows that the journal that contributed the most to the increase in the Top field impact factor ratio was Administrative Science Quarterly with an increase in Impact Factor from 1.98 in 1975 to 4.95 in 1995, when the impact factor ratio of Administrative Science Quarterly almost double the average impact factor of the Top 3 journals.[19]

Thus the trends in sociology were quite different as compared to economics. How can we account for this difference?

We now relate the developments in sociology to aspects of our model. The first point concerns growth in discipline: Figure 14 suggests that until 1995, there was only modest growth in the overall scale of the research in sociology (as compared to economics).[20] Second, there also appears to have been no large scale change in the broader intellectual environment comparable to economics. Indeed, Fourcade et al. (2015) and Angrist et al. (2020) show that economics is relatively more insular as compared to the other social sciences. In particular, Fourcade et al. (2015) have argued that a major distinguishing feature of economics, relative to sociology, is the much stronger cohesion of economics: different fields within sociology do not cite each other a great deal more than their citations of non-sociology journals. By contrast, economics journals

[19] We note that the trends on Top Field versus Top General journals is robust: it also holds if we were to exclude the Administrative Science Quarterly.

[20] We consider data from the WoS to compare the growth of the two disciplines using the same bibliography source. The coverage of journals listed in the WoS changed substantially in 2005, and this leads us to drop the years after 2005, as we do not know if the discipline grew due to an increase in fields size or due to an increase in the WoS coverage.



(a) Number of Journals

(b) Number of Articles

Figure 14: Sociology versus Economics: 1980-2004. Source: Web of Science.

rarely cite research outside economics. We interpret this as saying that the readership of the general journal is low in sociology and that it has not increased over time. Proposition 1 suggests that in the absence of a major expansion in sociology and with a low readership of the general journal, sociology lies in the intermediate region, with a hybrid outcome – field journals dominate in some fields, while the general journal dominates in other fields. The precise configuration at any moment will depend on whether a field is growing or shrinking (possibly due to exogenous reasons). This is in line with the trends in sociology over the 1970-2017 period.

6 Conclusion

This paper studies the trends in the influence of journals in economics over a period spanning almost five decades, from 1970 to 2017. At the start, in the early 1970's, a number of journals had similar influence, but by 1995 the five general journals – QJE, AER, RES, Econometrica, and JPE – had acquired a major lead. The top 5 journals were being cited around 4 times as much as other leading journals. This trend also holds if we consider instead the fraction of most influential articles being published in economics and if we take into account the birth of several new journals. In the period since 1995, Tier 2 journals like review of Economics and Statistics have made a recovery, but the state of the other leading journals remains more or less unchanged. To place these developments in a wider context, we studied the trends in sociology. The picture there is very different: the relative influence of top general journals – American Journal of Sociology, American Sociological Review, and Social Forces – actually declined over the 1975-1995 period, and by 2017 it was only very slightly higher the influence of the leading field journals.

A model of journals as 'platforms' is developed to help put these changes in perspective. In this model, there is a set of authors spread across research fields. Authors get ideas (of varying

quality). They seek to publish in journals that are widely read. There is a journal for every field – that publishes papers from that field only – and there is a general interest journal – that publishes papers from every field. It is assumed that every author reads the journal in his field and that a fraction of authors read the general interest journal. Every journal has a capacity that determines the number of papers it can publish. Journals accept the best papers submitted to them, subject to meeting this capacity. This models highlights the role of two factors – the growth in the number of fields and greater readership of the general journal.

Turning to empirical trends, we note that there was significantly more expansion in research in economics as compared to sociology. And, through the 1980's, there were major large scale changes in the political and intellectual context – the decline of communism and the rise of market liberalism – that reinforced the readership of general mainstream journals in economics. No such large scale change occurred in sociology. This helps account for the trends over time within economics and also the differences in trends between economics and sociology.

In the quarter of a century since 1995, the measured quality of the top general journals in economics has remained stable, while their prestige appears to be have grown significantly. Is the market value of a paper in a Top 5 general journal now out of line with its fundamental value?

References

Angrist, J., P. Azoulay, G. Ellison, R. Hill, and S. F. Lu (2020, May). Inside job or deep impact? extramural citations and the influence of economic scholarship. *Journal of Economic Literature 58*(1), 3–52.

Armstrong, M. (2006). Competition in two-sided markets. *RAND Journal of Economics 37*(3), 668–691.

Bergstrom, C. (2007). Eigenfactor: Measuring the value and prestige of scholarly journals. *College & Research Libraries News 68*(5), 314–316.

Bergstrom, C. T., J. D. West, and M. A. Wiseman (2008). The eigenfactor^{TM} metrics. *Journal of Neuroscience 28*(45), 11433–11434.

Bornmann, L., A. Butz, and K. Wohlrabe (2018). What are the Top Five Journals in Economics? A New Meta–ranking. *Applied Economics 50*(6), 659–675.

Brin, S. and L. Page (1998). The anatomy of a large-scale hypertextual web search engine. *Computer Networks and ISDN Systems 30*, 107–117.

Card, D. and S. DellaVigna (2013, March). Nine facts about top journals in economics. *Journal of Economic Literature 51*(1), 144–61.

Ellison, G. (2002). The slowdown of the economics publishing process. *Journal of Political Economy 110*(5), 947–993.

Ellison, G. (2013). How does the market use citation data? the hirsch index in economics. *American Economic Journal: Applied Economics 5*(3), 63–90.

Engemann, K. M. and H. J. Wall (2009, May/June). A journal ranking for the ambitious economist. *Federal Reserve Bank of St. Louis Review 91*(3), 127–139.

Fourcade, M., E. Ollion, and Y. Algan (2015). The superiority of economists. *Journal of Economic Perspectives 29*(1), 89–114.

Fukuyama, F. (1992). *The End of History and the Last Man*. Free Press, New York.

Garfield, E. (1955). Citation indexes for science: A new dimension in documentation through association of ideas. *Science 122*(3159), 108–111.

Goyal, S., M. J. van der Leij, and J. L. Moraga-González (2006). Economics: An emerging small world. *Journal of Political Economy 114*(2), 403–412.

Hamermesh, D. S. (2013, March). Six decades of top economics publishing: Who and how? *Journal of Economic Literature 51*(1), 162–72.

Hamermesh, D. S. (2018, March). Citations in economics: Measurement, uses, and impacts. *Journal of Economic Literature 56*(1), 115–56.

Heckman, J. J. and S. Moktan (2020). Publishing and promotion in economics: The tyranny of the top five. *forthcoming*.

Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences 102*(46), 16569–16572.

Kalaitzidakis, P., T. P. Mamuneas, and T. Stengos (2003). Rankings of academic journals and institutions in economics. *Journal of the European Economic Association 1*(6), 1346–1366.

Laband, D. and M. J. Piette (1994). The relative impacts of economics journals: 1970-1990. *Journal of Economic Literature 32*(2), 640–66.

Larivière, V. and C. R. Sugimoto (2019). The journal impact factor: A brief history, critique, and discussion of adverse effects. pp. 3–24.

Liebowitz, S. J. and J. P. Palmer (1984). Assessing the relative impacts of economics journals. *Journal of Economic Literature 22*(1), 77–88.

Moody, J. (2004). The structure of a social science collaboration network: Disciplinary cohesion from 1963 to 1999. *American sociological review 69*(2), 213–238.

Palacios-Huerta, I. and O. Volij (2004). The measurement of intellectual influence. *Econometrica 72*(3), 963–977.

Pinski, G. and F. Narin (1976). Citation influence for journal aggregates of scientific publications: Theory, with application to the literature of physics. *Information Processing & Management 12*, 297–312.

Rochet, J.-C. and J. Tirole (2003, June). Platform competition in two-sided markets. *Journal of the European Economic Association* (4), 990–1029.

Serrano, R. (2018). Top5itis. *Economics Bulletin 38*(2), A2.

West, J. and C. T. Bergstrom (2008). Pseudocode for calculating eigenfactor™ score and article influence™ score using data from thomson-reuters journal citations reports. mimeo, University of Washington.

A Journal List

1. AEJ-Applied Economics
2. AEJ-Macroeconomics
3. American Economic Review
4. American J. Agricultural Economics
5. American Political Science Review
6. Brookings Papers On Economic Activity
7. Cambridge J. Economics
8. Canadian J. Economics
9. J. Monetary Economics
10. Ecological Economics
11. Economic Development And Cultural Change
12. Economic Inquiry
13. Economic Journal
14. Economics Letters
15. Economic Policy
16. Economic Theory
17. Econometric Theory
18. Econometrica
19. Economica
20. Empirical Economics
21. Energy Economics
22. Energy Policy
23. Energy Journal
24. Environmental & Resource Economics
25. European Economic Review
26. European J. Political Economy
27. Experimental Economics
28. Games And Economic Behavior
29. ILR Review
30. IMF Economic Review
31. Industrial And Corporate Change
32. International Economic Review
33. International J. Industrial Organization
34. J. Accounting & Economics
35. J. Accounting Research
36. J. Applied Econometrics
37. J. Banking & Finance
38. J. Business
39. J. Business & Economic Statistics
40. J. Business Venturing
41. J. Comparative Economics
42. J. Consumer Research
43. J. Development Economics
44. J. Development Studies
45. J. Economic Behavior & Organization
46. J. Economic Dynamics & Control
47. J. Economic Geography
48. J. Economic Growth
49. J. Economic Literature
50. J. Economics & Management Strategy
51. J. Economic Perspectives
52. J. Economic Surveys
53. J. Economic Theory
54. J. Econometrics
55. J. Empirical Finance
56. J. Environmental Economics And Management
57. J. The European Economic Association
58. J. Finance
59. J. Financial Economics
60. J. Financial Intermediation
61. J. Financial And Quantitative Analysis
62. J. Health Economics

63. J. Human Resources
64. J. Industrial Economics
65. J. International Business Studies
66. J. International Economics
67. J. International Money And Finance
68. J. Labor Economics
69. J. Law & Economics
70. J. Law Economics & Organization
71. J. Money Credit And Banking
72. J. Political Economy
73. J. Population Economics
74. J. Public Economics
75. J. Risk And Uncertainty
76. J. Urban Economics
77. Labour Economics
78. Land Economics
79. Management Science
80. Marketing Science
81. Mathematical Finance
82. Oxford Bulletin Of Economics And Statistics
83. Oxford Economic Papers-New Series
84. Oxford Review Of Economic Policy
85. Public Choice
86. Quarterly J. Economics
87. RAND J. Economics
88. Regional Science And Urban Economics
89. Regional Studies
90. Research Policy
91. Resource And Energy Economics
92. Review Of Economic Dynamics
93. Review Of Economics And Statistics
94. Review Of Economic Studies
95. Review Of Financial Studies
96. Review Of International Economics
97. Review Of World Economics
98. Scandinavian J. Economics
99. World Bank Economic Review
100. World Development

B Replicating Heckmann and Moktan (2020) across time

We now replicate Table 3 of Heckman and Moktan (2020) across decades (70s, 80s, 90s and 00s), using our set of 16 journals. Their analysis is based on the total number of citations of the article. Instead, we use citations accumulated from the year of publication t to $t+9$. This 10-years citations control for the year of publication of the article.

C Proof of Proposition 1

Let $C \in \{0, 1, \ldots, F\}$ be the fields in which decision rule I is used; in the other $F - C$ fields authors use either decision rule II or III. The key to a characterization of equilibrium is to derive the cut-off thresholds for article quality, $t_f(d)$ and $t_g(d)$, and to delineate the conditions on the parameters under which these thresholds can be satisfied.

Consider first an equilibrium in which all the fields use decision rule I, so, $C = F$. In

Table 2: Volume-Adjusted Proportion of Articles: 1970–1979

Rank	Journal	Top 25%	Journal	Top 10%	Journal	Top 5%	Journal	Top 1%
1	JUE	11.2	**JPE**	12.6	**JPE**	15.3	JME	28.9
2	JET	8.7	**AER**	9.7	JME	12.3	**JPE**	19.8
3	**JPE**	8.5	JME	9.1	**AER**	11.9	**AER**	13.1
4	**AER**	8.1	ReStud	8.5	**ReStud**	7.9	JLE	8.3
5	JPub	8	JET	8.3	JET	7.7	**ECMA**	8.1
6	**ReStud**	7.7	JLE	7.3	JPub	7.1	JET	6.7
7	IER	7.2	JUE	7.3	**ECMA**	7.1	ReStud	5.5
8	ReStat	7.2	JPub	7.3	JLE	6.6	IER	4.3
9	JLE	7.2	ReStat	6.5	**QJE**	6	**ReStat**	2.8
10	**QJE**	6.3	**QJE**	6.3	ReStat	5	**QJE**	1.4
12	JME	5.5	**ECMA**	6.2	IER	3.4	EJ	1.1
13	**ECMA**	5.2	IER	4.2	JUE	3.3	JUE	0.0
13	JIE	4.5	JIE	3.8	JIE	3.1	JIE	0.0
14	JDE	3.3	JDE	1.6	JDE	1.8	JPub	0.0
15	EJ	1.5	EJ	1.2	EJ	1.5	JDE	0.0

Note: Proportions of highly cited articles published by different journals. We use cites obtained during the first 10 years after the publication of the article. *Definition of journal abbreviations:* QJE–Quarterly Journal Of Economics, JPE–Journal Of Political Economy, ECMA–Econometrica, AER–American Economic Review, ReStud–Review Of Economic Studies, ReStat–Review Of Economics And Statistics, EJ–Economic Journal, RAND–Rand Journal Of Economics, JDE–Journal Of Development Economics, JPub–Journal Of Public Economics, JOE–Journal Of Econometrics, JME–Journal Of Monetary Economics, JET-Journal of Economic Theory, JIE-Journal of International Economics, JUE-Journal of Urban Economics, JLE-journal of Law and Economics.

Table 3: Volume-Adjusted Proportion of Articles: 1980–1989

Rank	Journal	Top 25%	Journal	Top 10%	Journal	Top 5%	Journal	Top 1%
1	**ECMA**	11	**ECMA**	14.7	**ECMA**	18.3	**ECMA**	29.6
2	RAND	10.8	**JPE**	12.5	**JPE**	16.2	**JPE**	21.7
3	**JPE**	9.5	RAND	11.5	JME	10	JME	12.7
4	JME	8	JME	9	**AER**	9.8	JLE	7.6
5	**ReStud**	7.3	**AER**	8	**QJE**	8.4	**AER**	7.6
6	**AER**	7.2	JLE	7.2	JLE	7.8	**QJE**	6.5
7	JLE	7.1	**QJE**	7.1	RAND	7.1	JOE	3.5
8	**QJE**	6.3	**ReStud**	6.8	**ReStud**	5.4	**ReStud**	2.3
9	JET	5.2	JOE	4.6	JET	4.6	RAND	2.3
10	JOE	5.1	JET	4.4	JOE	3.9	JIE	1.9
11	ReStat	4.3	JPub	2.9	ReStat	2	JET	1.7
12	JPub	4.1	ReStat	2.7	JIE	2	EJ	1.4
13	JUE	3.7	IER	2.1	JPub	1.3	IER	1.1
14	JIE	3.2	JIE	2.1	EJ	1.3	JDE	0.0
15	IER	3.1	JUE	2	IER	1.1	JPub	0.0
16	EJ	2.4	EJ	1.6	JDE	0.5	JUE	0.0
17	JDE	1.7	JDE	0.8	JUE	0.2	ReStat	0.0

equilibrium the capacity constraint of the general journal is binding. So it follows that $t_g(d)$ must solve $nF\left(1 - H(t_g(d))\right) = \kappa_g$. Simplifying and rearranging terms yields:

Table 4: Volume-Adjusted Proportion of Articles: 1990–1999

Rank	Journal	Top 25%	Journal	Top 10%	Journal	Top 5%	Journal	Top 1%
1	**QJE**	13	**QJE**	21.8	**QJE**	23.7	**QJE**	34.7
2	**JPE**	11.1	**JPE**	14.5	**JPE**	17.2	**ECMA**	17.8
3	**ECMA**	10.5	**ECMA**	12.4	**ECMA**	12.6	**JPE**	15.7
4	**ReStud**	8.5	**ReStud**	8.7	**ReStud**	10	**ReStud**	8.2
5	**AER**	7.4	**AER**	8	**AER**	8.9	JME	6.5
6	RAND	7.1	JME	5.6	JOE	6.2	**AER**	6.4
7	JME	6.2	JOE	5.3	JME	4.6	JOE	4.3
8	JLE	6.2	RAND	3.9	JIE	3.5	JIE	4.2
9	JOE	5.3	ReStat	3.2	IER	2.6	IER	0.9
10	ReStat	4	JLE	3.2	ReStat	2.4	EJ	0.8
11	JPub	3.8	JIE	2.9	RAND	2	ReStat	0.6
12	JIE	3.8	JPub	2.1	JUE	1.4	JDE	0.0
13	JET	3.3	JET	2	JET	1.3	RAND	0.0
14	JUE	3.1	IER	1.9	JLE	1.2	JPub	0.0
15	JDE	2.7	JDE	1.6	JDE	0.8	JLE	0.0
16	IER	2.3	JUE	1.6	EJ	0.8	JET	0.0
17	EJ	1.8	EJ	1.3	JPub	0.7	JUE	0.0

Table 5: Volume-Adjusted Proportion of Articles: 2000–2009

Rank	Journal	Top 25%	Journal	Top 10%	Journal	Top 5%	Journal	Top 1%
1	**QJE**	16.2	**QJE**	25.7	**QJE**	29.5	**QJE**	35.6
2	**JPE**	10.3	**JPE**	12.3	**ECMA**	12.8	**ECMA**	13.2
3	**ECMA**	9.7	**ECMA**	10.3	**JPE**	12.4	**AER**	8.8
4	**AER**	8.2	**AER**	8.5	**AER**	9.1	ReStat	8.4
5	**ReStud**	7.5	**ReStud**	7.8	**ReStud**	7.2	**JPE**	8.2
6	ReStat	7.4	ReStat	6.5	ReStat	6.6	**ReStud**	5.9
7	JIE	5.3	JIE	4.3	JIE	3.5	RAND	4.6
8	JME	4.3	JOE	3.6	JOE	3.3	JOE	4.5
9	JDE	4.3	JDE	3.4	JME	2.9	JIE	2.1
10	JOE	4.2	JME	3.3	JDE	2.6	IER	2
11	JUE	4.1	JPub	2.8	RAND	2.1	JDE	2
12	JPub	4	JLE	2.5	EJ	2.1	JME	1.8
13	JLE	4	RAND	2.3	JUE	2	EJ	1.5
14	RAND	3.9	JUE	2.3	JPub	2	JPub	1.5
15	EJ	2.8	EJ	2.3	IER	1.4	JET	0.0
16	IER	1.9	IER	1.5	JLE	0.4	JLE	0.0
17	JET	1.9	JET	0.6	JET	0.1	JUE	0.0

$$t_g(d) = H^{-1}\left(1 - \frac{\kappa_g}{nF}\right) =: \tilde{t}_g(F). \tag{21}$$

From equation (12), and noting that the denominator equals capacity κ_g, it follows that the

Table 6: Volume-Adjusted Proportion of Articles: 2010–2017

Rank	Journal	Top 25%	Journal	Top 10%	Journal	Top 5%	Journal	Top 1%
1	**QJE**	13.2	**QJE**	20.9	**QJE**	27.5	**QJE**	37.3
2	**ECMA**	8.8	**AER**	9.3	**ECMA**	9.8	**AER**	12.9
3	**ReStud**	8.5	**ECMA**	9	**AER**	9.1	**ECMA**	12.0
4	ReStat	8.2	**JPE**	9	**JPE**	8.3	**ReStud**	9.6
5	**JPE**	7.9	**ReStud**	8.6	ReStat	8.1	**JPE**	5.6
6	**AER**	7.6	ReStat	7.7	**ReStud**	6.7	ReStat	4.3
7	EJ	5.7	EJ	5.1	JDE	5.4	JDE	3.2
8	JUE	5.4	JUE	5.1	EJ	4.1	JME	2.9
9	JDE	5.3	JDE	5	JUE	4	JPub	2.5
10	JIE	5.2	JIE	4.2	JIE	3.6	EJ	2.4
11	JPub	4.8	JPub	3.6	JPub	3.1	JIE	2.4
12	RAND	4.3	RAND	3.5	JOE	3.0	JOE	1.9
13	JOE	3.9	JME	3.2	JME	2.5	JUE	1.5
14	JME	3.8	JOE	2.9	RAND	2.4	IER	1.4
15	IER	2.9	JLE	1.4	IER	1.1	RAND	0.0
16	JLE	2.5	IER	1.1	JLE	0.9	JLE	0.0
17	JET	2	JET	0.5	JET	0.3	JET	0.0

expected quality of the general journal is

$$A_g(d) = \frac{nF}{\kappa_g} \int_{\tilde{t}_g(F)}^{\infty} vh(v)\, dv =: \tilde{A}_g(F)$$

The general journal is preferred to the field journal; from symmetry across fields, the threshold for the field journal is equal across fields and must satisfy the equation:

$$n\left(H(\tilde{t}_g(F)) - H(t_f(d))\right) = \kappa. \tag{22}$$

Substituting for $\tilde{t}_g(F)$ from above, and simplifying, yields:

$$t_f(d) = H^{-1}\left(1 - \frac{\kappa_g}{nF} - \frac{\kappa}{n}\right) =: \tilde{t}_f(F). \tag{23}$$

The expected quality of every field journal is

$$A_f(d) = \frac{n}{\kappa} \int_{\tilde{t}_f(F)}^{\tilde{t}_g(F)} vh(v)\, dv =: \tilde{A}_f(F)$$

It is optimal for individual authors to follow this decision rule if and only if submitting to general journal yields higher utility than submitting to field journal, i.e., $n\tilde{A}_f(F) < \alpha nF\tilde{A}_g(F)$, i.e.,

$$\alpha F > \frac{\tilde{A}_f(F)}{\tilde{A}_g(F)} \tag{24}$$

We will refer to the ratio of quality of journals as the journal impact ratio: in this equilibrium it is given by $\tilde{A}_f(F)/\tilde{A}_g(F)$.

Consider next an equilibrium in which authors in all fields prefer the field journal to the general journal: $C = 0$. As the capacity constraint of every field journal is binding, by symmetry of the fields the thresholds are the same in all fields and must solve the equation $n\left(1 - H(t_f(d))\right) = \kappa$. Simplifying, and rearranging, yields

$$t_f(d) = H^{-1}\left(1 - \frac{\kappa}{n}\right) =: \bar{t}_f. \tag{25}$$

It follows that the expected quality of a field journal is

$$A_f(d) = \frac{n}{\kappa}\int_{\bar{t}_f}^{\infty} vh(v)\, dv =: \bar{A}_f.$$

In all fields, the field journal is preferred to the general journal: so $t_g(d)$ solves

$$nF\left(H(\bar{t}_f) - H(t_g(d))\right) = \kappa_g \tag{26}$$

Substituting for $\bar{t}_f$ and simplifying yields:

$$t_g(d) = H^{-1}\left(1 - \frac{\kappa F + \kappa_g}{nF}\right) =: \hat{t}_g(0) \tag{27}$$

The expected quality of the general journal is given by

$$A_g(d) = \frac{nF}{\kappa_g}\int_{\hat{t}_g(0)}^{\bar{t}_f} vh(v)\, dv =: \hat{A}_g(0)$$

It is optimal for authors in every field to follow this rule if and only if utility from the field journal is greater than the utility from the general journal, i.e.,

$$\alpha F \leq \bar{A}_f/\hat{A}_g(0). \tag{28}$$

Consider next the case where authors in all fields make no submissions to the general journal: this cannot occur in equilibrium, as there will exist authors with papers below their field journal threshold who can derive positive utility by submitting their paper to the general journal that has idle capacity.

The interest now turns to equilibria that exhibit a mix of decision rules. Consider the case

where C fields use decision rule I while the remaining $F - C$ fields use decision rule II. For a field, f, that uses decision rule II the threshold for the field journal $t_f(g) = \bar{t}_f$. Consequently, the expected quality of the journal in such a field is $A_f(d) = \bar{A}_f$. Next, consider the general journal. In C fields, all authors with idea $v_i \geq t_g(d)$, and in the other $F - C$ fields, all authors with idea $v_i \in [t_g(d), \bar{t}_f)$ submit their paper to the general journal. This means that $t_g(d)$ solves

$$nC\left(1 - H(t_g(d))\right) + n(F - C)\left(H(\bar{t}_f) - H(t_g(d))\right) = \kappa_g.$$

Substituting for $\bar{t}_f$ and simplifying yields:

$$t_g(d) = H^{-1}\left(1 - \frac{\kappa(F - C) + \kappa_g}{nF}\right) =: \hat{t}_g(C). \tag{29}$$

However, for this decision rule to be feasible it must be the case that $\hat{t}_g(C) < \bar{t}_f$ or equivalently $\kappa_g > \kappa C$. Consequently, the expected quality of the general journal is

$$A_g(d) = \frac{n}{\kappa_g}\left(C\int_{\bar{t}_f}^{\infty} vh(v)\ dv + F\int_{\hat{t}_g(C)}^{\bar{t}_f} vh(v)\ dv\right) =: \hat{A}_g(C).$$

In fields that use decision rule I, authors submit their paper to field journal if $v_i \in \left[t_f(d), \hat{t}_g(C)\right)$. Hence, $t_f(d)$ solves $n\left(H(\hat{t}_g(C)) - H(t_f(d))\right)$. The solution is

$$t_f(d) = H^{-1}\left(1 - \frac{\kappa(2F - C) + \kappa_g}{nF}\right) =: \hat{t}_f(C) \tag{30}$$

. The expected quality of the field journal is

$$A_f(d) = \frac{n}{\kappa}\int_{\hat{t}_f(C)}^{\hat{t}_g(C)} vh(v)\ dv =: \hat{A}_f(C),$$

For fields that follow decision rule I, the journal impact ratio is

$$\frac{A_f(d)}{A_g(d)} = \frac{\hat{A}_f(C)}{\hat{A}_g(C)} \tag{31}$$

and for fields that use decision rule II, the journal impact ratio is

$$\frac{A_f(d)}{A_g(d)} = \frac{\bar{A}_f}{\hat{A}_g(C)}. \tag{32}$$

Observe that authors will abide by decision rules I and II, respectively, if and only if their utility is maximized in doing so. For the utility conditions to hold it must be that in fields that follow decision rule I, the utility to general journal is larger, while in fields that follow decision

rule II the utility from field journal is higher, i.e.,

$$\frac{\hat{A}_f(C)}{\hat{A}_g(C)} < \alpha F \leq \frac{\bar{A}_f}{\hat{A}_g(C)}. \tag{33}$$

Consider finally the equilibrium in which C fields where $C \in \{1, \ldots, F-1\}$ follow the decision rule I while $F-C$ fields follow decision rule III. The threshold for a field which abides by decision rule III, $t_f(d) = \bar{t}_f$. The expected quality of such a journal is $A_f(d) = \bar{A}_f$. The threshold for the general journal must solve the following condition: $nC\left(1 - H(t_g(d))\right) = \kappa_g$. Simplifying and solving yields $t_g(d) = H^{-1}\left(1 - \frac{\kappa_g}{nC}\right) = \tilde{t}_g(C)$ as in (21).

For decision rule III to be sustained in an equilibrium, it must also be the case that $\bar{t}_f \leq \tilde{t}_g(C)$, or equivalently, $\kappa_g \leq \kappa C$. Otherwise, authors with an idea between $t_g(d)$ and $\bar{t}_f$ would submit their paper to the general journal instead of the not submitting to a journal at all. The expected quality of the journal is $A_g(d) = \tilde{A}_g(C)$. In fields that follow decision rule 1, authors submit their paper to their field journal if $v_i \in [t_f(d), \tilde{t}_g(C))$. Hence, $t_f(d)$ solves $nC\left(H(\tilde{t}_g(C)) - H(t_f(d))\right) = \kappa$, that is, $t_f(d) = \tilde{t}_f(C)$. The corresponding field journal expected quality is $A_f(d) = \tilde{A}_f(C)$. The journal impact ratio for fields that follow decision rule I is

$$\frac{A_f(d)}{A_g(d)} = \frac{\tilde{A}_f(C)}{\tilde{A}_g(C)} \tag{34}$$

and for fields that follow decision rule III the impact ratio is

$$\frac{A_f(d)}{A_g(d)} = \frac{\bar{A}_f}{\tilde{A}_g(C)}. \tag{35}$$

It is optimal for authors to abide by these rules if $\kappa_g \leq \kappa C$ and

$$\frac{\tilde{A}_f(C)}{\tilde{A}_g(C)} < \alpha F \leq \frac{\bar{A}_f}{\tilde{A}_g(C)}. \tag{36}$$

Consider a combination of decision rules II and III: this would require that the threshold $\bar{t}_f$ be different across fields. This is not feasible as the fields are all of equal size and journals have same capacity.

Taking the conditions for equilibrium existence (24), (28), (33) and (36) together, we can define a lowerbound K_1 and upperbound K_2, such that decision rule II in all fields is the unique equilibrium if $\alpha F \leq K_1$, and decision rule I in all fields the unique equilibrium if $\alpha F > K_2$. To define K_1, we first define an auxiliary function, which combines the lower thresholds of (24), (33)

and (36):

$$K(C) = \begin{cases} \hat{A}_f(C)/\hat{A}_g(C) & \text{if } 0 \leq C < \frac{\kappa_g}{\kappa} \\ \tilde{A}_f(C)/\tilde{A}_g(C) & \text{if } \frac{\kappa_g}{\kappa} \leq C \leq F \end{cases} \tag{37}$$

Then

$$K_1 = \min_{C \in \{1,\ldots,F\}} K(C). \tag{38}$$

K_2 is easier to define. Since both $\tilde{A}_g(C)$ and $\hat{A}_g(C)$ increase in C, it follows that $\bar{A}_f/\tilde{A}_g(C)$ and $\bar{A}_f/\hat{A}_g(C)$ decrease in C. Hence, the maximum threshold over $C \in \{0, \ldots, F-1\}$ is always

$$K_2 = \frac{\bar{A}_f(0)}{\hat{A}_g(0)}. \tag{39}$$

This completes the proof.

■