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ON THE INFLUENCE OF TOP JOURNALS

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August 1, 2020

Abstract

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1 Introduction

One aspect of the organisation of economic research has recently attracted a great deal of attention – the importance accorded to publications in the so-called "Top 5" journals.[1] At leading departments, publishing in Top 5 journals is 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 the insularity and pressures to conform in the profession. The 2017 AEA Annual Meeting held a widely watched panel discussion on this topic, "Publishing and Promotion in Economics: The Curse of the Top Five". A senior economist has gone so far as to describe the focus of the profession on these journals as "top5itis" (Serrano (2018)).[2]

These discussions motivate a closer examination of the empirical 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 citations offer 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), and for a study of alternative ranking methods, see Demange (2014).

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.
- Tier 2 general interest journals – Economic Journal, International Economic Review, and Review of Economics and Statistics.
- Top field journals – Journal of International Economics, Journal of Law and Economics, Journal of Econometrics, Journal of Economic Theory, Journal of Urban Economics, Journal of Monetary Economics, RAND Journal of Economics, Journal of Public Economics, and Journal of Development Economics.

[1] These journals are *American Economic Review, Econometrica, Journal of Political Economy, Review of Economic Studies, and Quarterly Journal of Economics*. See Card and DellaVigna (2013) for a careful discussion of trends in publishing in the top 5 journals.

[2] For a broad discussion on these concerns, see Angrist, Azoulay, Ellison, Hill, and Lu (2020), Fourcade, Ollion, and Algan (2015) and Heckman and Moktan (2020).

The influence ratio is computed as the average Impact Factor (hereafter, IF) of field 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 remained relative stable: the ratio in 2017 is similar to what it was in 1995.[4]

To understand these trends we turn to a closer examination of the evolution of the citation network among these 17 journals. Figure 4 presents snap shots of the citation structure at five points in time – 1977, 1987, 1997, 2007, and 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 two main forces at work: the number of fields and the readership of the general journal. If the number of fields times the readership of the general journal is small then

[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.

[4] Most of the recovery of Tier 2 journals is due to Review of Economics and Statistics and Economic Journal, the standing of IER in 2017 is similar to that of 1995. For completeness, we also include prominent new journals that appeared in the 2000s, such as the American Economic Journals, Quantitative Economics, and the Journal of the European Economic Association, see Section 3.3.

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 equilibria with different standing of general and field journals across the fields. As the number of fields expands and the readership of the general journal grows, the model predicts a move toward an equilibrium in which the general journal dominates all field journals.

We use the model as a lens through which to view the evolution of economics. 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 – such as the collapse of communism – that led to a shift in favour of mainstream economics. This historical moment was perhaps best captured in the 1992 book, *The End of History and the Last Man*, by Francis Fukuyama. These two developments taken together moved key parameters of the model – the number of fields went up and this was reinforced by an increase in the readership of the general journals. In line with the predictions of the theory, this led to a rise in status of the Top 5 general journals.

To place the situation in economics in a broader context, we examine trends in one other social science: sociology. We consider two top general interest journals – American Journal of Sociology and American Sociological Review – and we consider 7 Top Field journals — Administrative Science Quarterly, Demography, Journal of Health and Social Behavior, Journal of Marriage and Family, 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 2 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 two general interest journals, for stretches of time. Thus the trends in sociology are quite different as compared to economics.

Our model helps us understand this difference. While some fields grew the overall growth in sociology research was relatively modest as compared to economics, and there was no major large scale change in the broader intellectual environment in sociology that is comparable to economics. Indeed, Angrist, Azoulay, Ellison, Hill, and Lu (2020) and Fourcade, Ollion, and Algan (2015) show that economics is relatively more insular as compared to the other social sciences – sociology, political science and anthropology.[5] In particular, Fourcade, Ollion, and Algan (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.[6] This is consistent with a low level of readership of the general journals. Viewing the lower overall growth of research and the low readership of general journals in sociology through the lens of the model suggests that there should be no trend toward greater dominance of general journals in sociology. This is indeed what we observe over the 1970-2017 period.

Our paper is a contribution to the study of research in economics. Notable contributions in this field include Angrist, Azoulay, Ellison, Hill, and Lu (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. We build on 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 make three main contributions to this literature: first, our paper provides the first comprehensive description of the trends in the influence of top economics journals over a period stretching almost fifty years, from 1970 until 2017. This long period brings into focus a major fact about journals: the dominance of Top 5 journals was established by 1995 and that there have been only relatively minor changes in the standing of journals after that (barring for the status of Review of Economics and Statistics). Second, we place this development in a broader context by presenting a study of the contrasting trends in sociology. Third, we present a theoretical model that helps us understand the 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 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

[5] Angrist, Azoulay, Ellison, Hill, and Lu (2020) do find that economics is becoming less insular over time.

[6] 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-Gonzalez (2006). An important difference between these papers and the present paper is that they study the network of coauthorships, while we study the network of citations across journals. For a study of intellectual integration in economics and sociology that broadly confirms our view of journals in the two disciplines, see Moody and Light (2006) and Edelman and Moody (2015).

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).[7] 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: alternative measures of influence; accounting for changes in the popularity of fields and the age of journals; and considering a dynamic set of top field journals. 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).[8]

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. We also include the American Economic Journals, Economic Theory, Quantitative Economics and the Journal of the European Economic Association in the robustness section.

[7] See Armstrong (2015) for some models of journals as platforms.

[8] 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.

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. 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 61,192 to 57,454. This selection excluded practically all the articles in 'Papers and Proceedings' issues of all the major journals. 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 Economy, 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 Economics, Journal of Monetary Economics[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 of 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.[11] 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

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

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

[11]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.

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 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).[12]

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

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

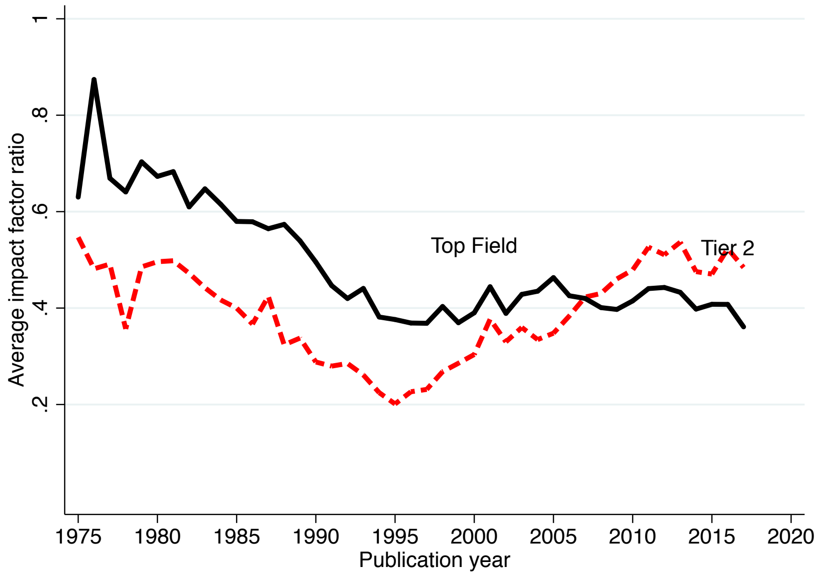
This measure allows temporal comparisons of the evolution of the relative influence of journals across time. We consider a 5-year impact factor ratio, the results are robust to 2 and 10-year impact factors.[13]

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:

[12]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 $IF^p_{i,t}$.

[13]Ellison (2002) used a slight variation on 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.



Note: The non-linear trends of the Impact factor Ratio of Tier 2 and the Impact factor Ratio of Top Field are significantly different at the 1% (F-stat.: 78.17; p-value: 0.000). We found a structural break using a Supremum Wald test in 1995 (swald stat.: 132.23; p-value: 0.000) for Tier 2 and a break in 1996 (swald: 92.78; p-value: 0.0000) for Top Field.

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 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.

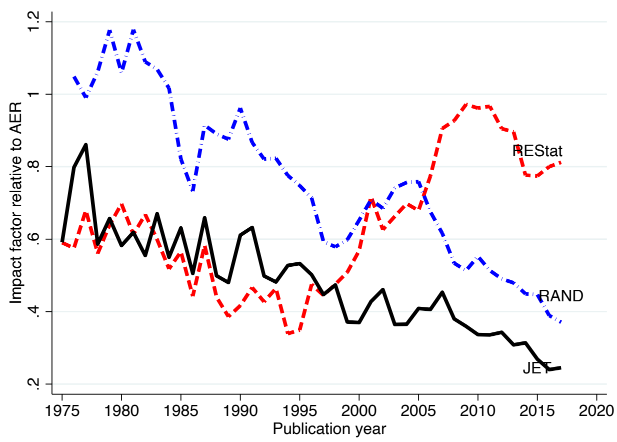
To test that the difference in the trends between Tier 2 and Top Field journals is indeed significant, we regress the Impact Factor Ratio on a trend and its squared, a dummy for Top Field, and interaction terms between the dummy and the trend and its squared. The coefficients of the interaction terms are jointly statistically significantly at the 1%. The non-linear trends of the

Impact factor Ratio of Tier 2 and the Impact factor Ratio of Top Field are significantly different at the 1% (F-stat.: 78.17; p-value: 0.000).

To test for a structural break in the trends, we use a Supremum Wald test for a structural break at an unknown break date after regressing the impact factor ratio of Tier 2 and Top Field in a quadratic time trend. We found a structural break in 1995 (swald stat.: 132.23; p-value: 0.000) for Tier 2 and a break in 1996 (swald: 92.78; p-value: 0.0000) for Top Field.

The changes in the relative status of journals is nicely summarized in a comparison of the evolution of the Journal of Economic Theory (JET), RAND Journal of Economics (RAND), and Review of Economics and Statistics (ReStat), relative to the American Economic Review. We

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



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, RAND and ReStat fell sharply. The impact factor ratio of ReStat recovered significantly after 1995, while the status of JET and RAND 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 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.

To summarize,

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

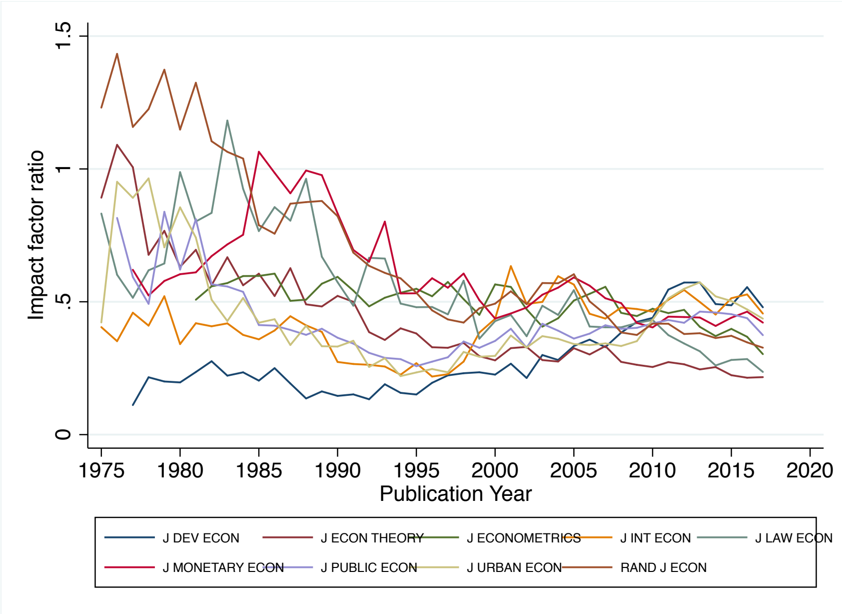


Figure 3: Impact factor ratio per journal

- *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 (due to the improvement in the standing of Economic Journal and Review of Economics and Statistics). The gap between the Top Field journals and Top 5 remained essentially unchanged.*
- *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 publication year. 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 $t-5$ to $t-1$. 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 $t-5$ to $t-1$ 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 3.1 for a formal definition). The journal with the maximum Article Influence Score (AIS) is located at 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*

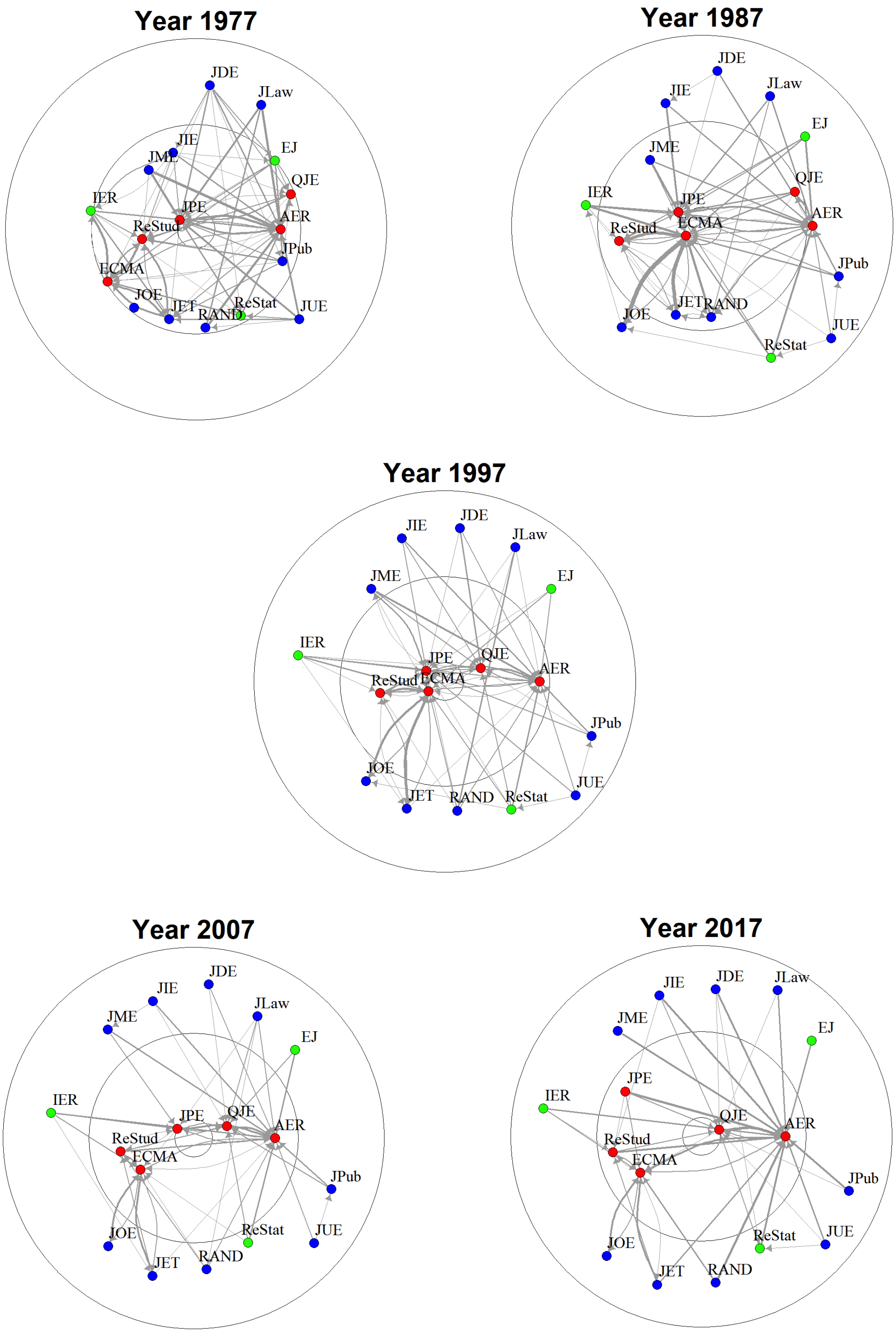


Figure 4: The Emerging Core-Periphery Structure

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). Only citation links that covered at least 5% of the outgoing citations of a journal (except self-loops) are shown. The location of a journal in this figure is based on its Article Influence Score (AIS), see Section 3.1 for a formal definition. The journal with the maximum Article Influence Score (AIS) is located at 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.

5 but hardly cite each other.

- *In the period after 1997, the core-periphery structure is further consolidated.*

3 Robustness

We now perform a series of robustness checks to check that the observed trends hold under a variety of different specifications. The robustness checks are categorized in three classes: alternative measures of journal influence; accounting for confounding factors; and using a time-varying list of top journals. These investigations suggest that the principal trends identified in the previous section are robust.

3.1 Alternative measures of journal influence

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.

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

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

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

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

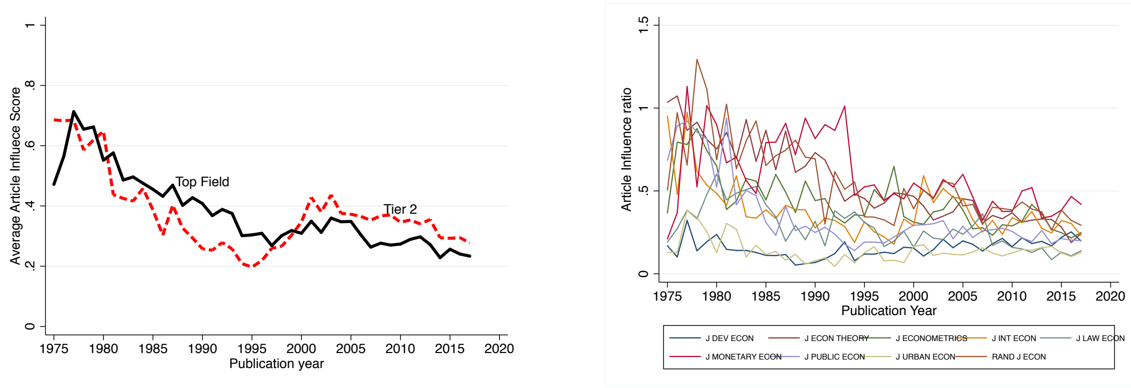
Normalising this measure by the number of articles a_i of a journal, Pinski and Narin (1976) obtains a measure called Influence Per Publication (IPP), that is,

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

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™

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.



(a) Article influence score ratio.

(b) Article Influence Score ratio per journal

Note: The non-linear trends of the Article Influence Score Ratio of Tier 2 and the Article Influence Score Ratio of Top Field are significantly different at the 1% (F-stat.: 5.56; p-value: 0.004). We found a structural break using a Supremum Wald test in 2000 (swald stat.: 297.99; p-value: 0.000) for Tier 2 and a break in 1994 (swald stat.: 47.90; p-value: 0.000) for Top Field.

project ?bergstromwestwiseman2008. The AIS omits journal self-citations and ensures that the citation matrix is ergodic, see West and Bergstrom (2008) for details.[14]

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.

We present the results of the trends in AIS in Figure 5. Figure 5a 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. As in the case of the impact factor, we observe a big increase in the influence gap between Top 5 and other top journals before 1995. After that, there was a short reversal until 2003, followed by a further decline. By 2017, the article influence score ratio is 0.28 for Tier 2 and 0.24 for Top Field. This is in contrast to the trends observed in Figure 1, in which the IFR for the Tier 2 journals showed a strong rebound after 1995, whereas the IFR for the Top Field journals remained flat.

Regarding the result on the convergence of the influence of Top Field journals, Figure 5b shows the AIS ratio of the individual top Field journals. We observe a similar convergence of the AIS ratios of the Top Field journals as we saw in the case of the impact factor.

We observe that until 2003, the trends of IFR and AIS correspond. However, after 2003 we observe a further decline in the AIS ratio of Tier 2 and Top Field journals, whereas the

[14] 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 (2008) 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).

Impact Factor ratio recovered for Tier 2 journals and remained flat for Top Field journals. To understand this result, we note that there are two main differences between the IF and the AIS measures. First, the AIS weights the citations according to the influence of the citing journal, and the IF does not. Second, the AIS can only be computed for the 100 economic Journals data set, whereas the IFR is computed using the Top-journals data set which counts citations from any journal in the Web of Science database, inside and outside of economics.[15]

To investigate which of these two factors have the largest contribution, we also compute the impact factor ratio based on citations from the 100-Journals database only. Results are shown in Figure 6. We observe that the IFR in this data set remains flat after 1995 for the Top Field journals. For the Tier 2 journals, the IFR remains quite flat from 2001 on. The trends observed in Figure 6 are more in line with those in Figure 1. We conclude that the observed trends in the IFR are robust to the smaller coverage of the 100-Journal data set, and that the declining trend in the AIS ratio after 2003 is mainly due to a relative decline in the influence of journals that cite Tier 2 and Top Field journals, relative to journals that cite Top 5 journals. This last observation is in line with Observation 2 made in Section 2.3.

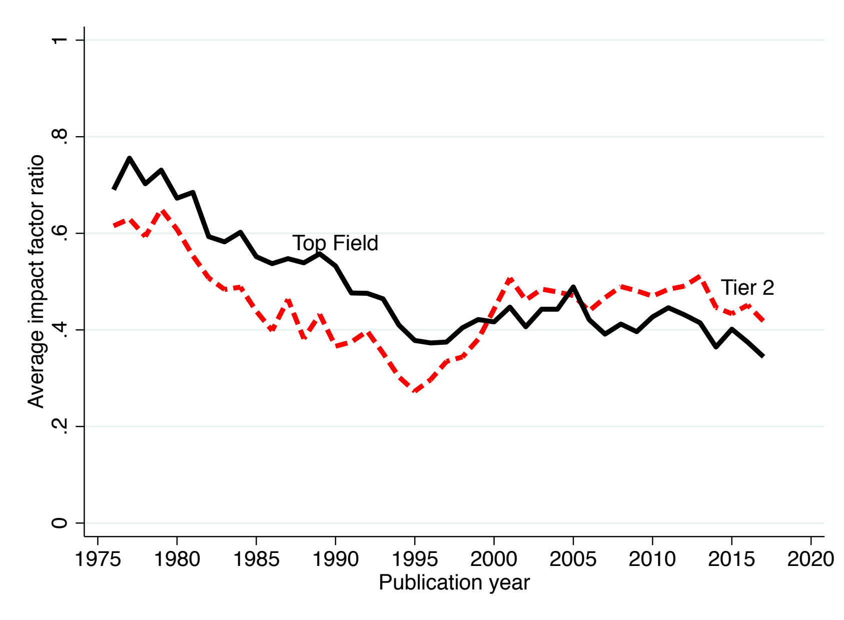


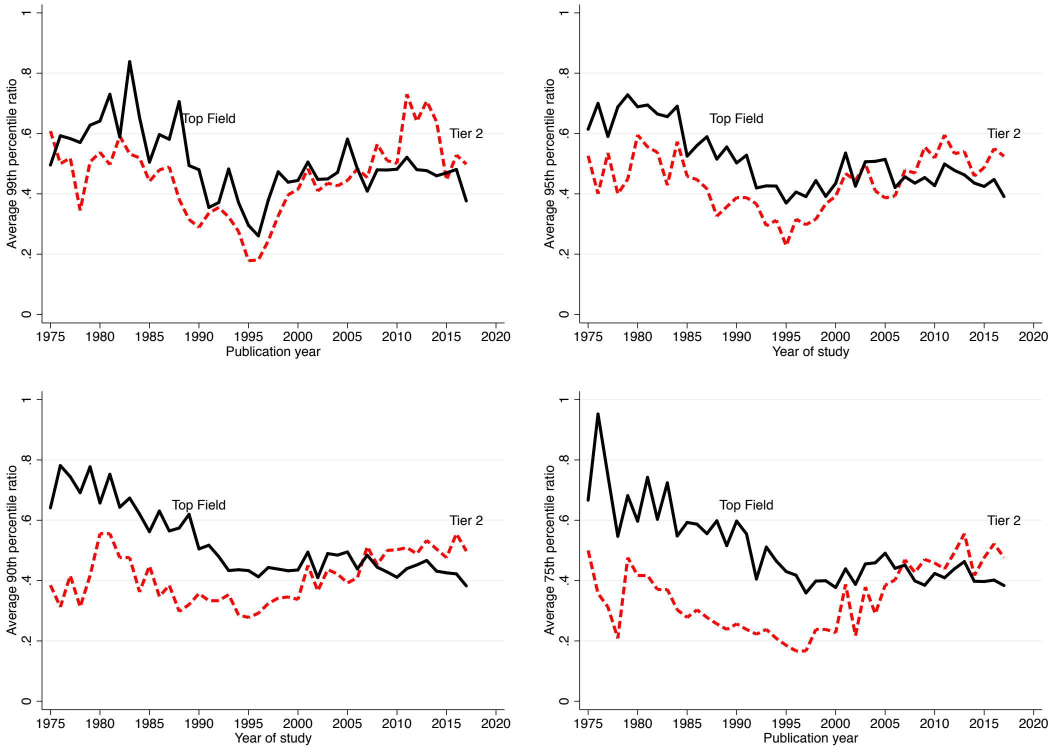
Figure 6: Impact factor ratio.
Note: The non-linear trends of the Impact Factor Ratio of Tier 2 and the Impact Factor Ratio of Top Field are significantly different at the 1% (F-stat.: 46.20; p-value: 0.004). We found a structural break using a Supremum Wald test in 1995 (swald stat.: 231.12; p-value: 0.000) for Tier 2 and a break in 2011 (swald stat.: 85.08; p-value: 0.000) for Top Field.

We next consider another robustness check on the influence measure. The two measures we have looked at so far both focus on the 'average' number of citations per paper, which is

[15]A third difference is that the AIS is corrected for self-citations whereas the IFR is not. It turns out that this factor plays no role in explaining the trends. Results can be asked from the authors.

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

Figure 7: Ratio of Percentiles



Note: The non-linear trends of the Percentile Ratios of Tier 2 and Top Field are all significantly different at the 1%. For the percentile 99, we found a structural break using a Supremum Wald test in 2011 (swald stat.: 100.76; p-value: 0.000) for Tier 2 and a break in 1999 (swald stat.: 64.18; p-value: 0.000) for Top Field. For the percentile 95, we found a structural break using a Supremum Wald test in 2011 (swald stat.: 83.30; p-value: 0.000) for Tier 2 and a break in 1995 (swald stat.: 65.28; p-value: 0.000) for Top Field. For the percentile 90, we found a structural break using a Supremum Wald test in 1995 (swald stat.: 52.68; p-value: 0.000) for Tier 2 and a break in 1993 (swald stat.: 64.23; p-value: 0.000) for Top Field. For the percentile 75, we found a structural break using a Supremum Wald test in 1996 (swald stat.: 79.84; p-value: 0.000) for Tier 2 and a break in 1997 (swald stat.: 39.45; p-value: 0.000) for Top Field.

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.

[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.

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 $IP_{i,t}^{5} = 0.05$.[17]

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

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

Similarly, the influence ratio for Top Field journals is:

$$IPR_{TopField,t}^{5} = \frac{\sum_{i \in TopField} Z_{i,t}^{5}/8}{\sum_{i \in Top5} Z_{i,t}^{5}/5} \tag{8}$$

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).

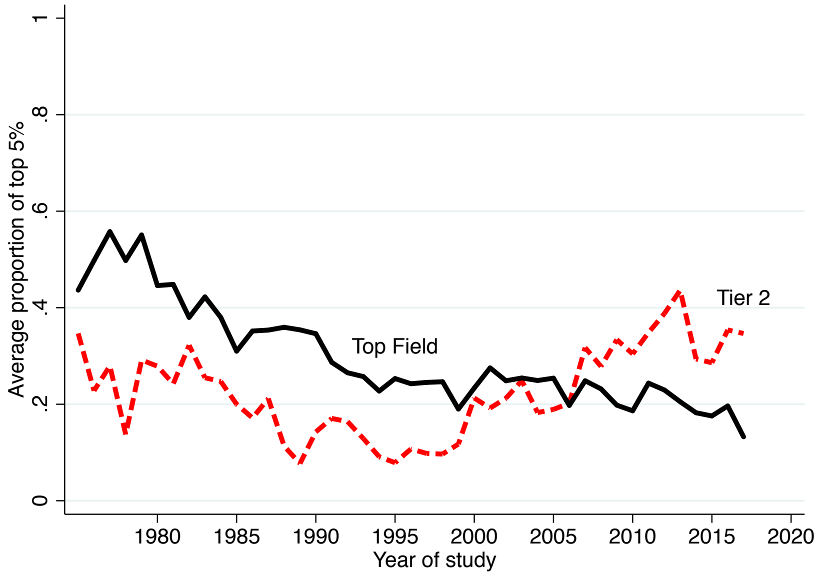
The trends on ratio of top cited papers are broadly consistent with the trends on impact factor ratio observed in Section 2. There was a steady decline in the fraction of top papers published in the Tier 2 general interest journals and Top field journals, relative to the Top 5 journals, until 1995. After 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.

3.2 Accounting for confounding factors

In this section, we study if the observed trends hold when we control for confounding factors. The influence of a journal might change over time because the journal adapts and publishes more articles in new topics or fields that are more popular or cited; thus, the emergence of the top 5 in

[17] Heckman and Moktan (2020) consider the total received citations following a publication. Their approach is more difficult to compare to the base scenario of Section 2.2. However, we replicate the Heckman and Moktan (2020) analysis for our data in Appendix B.

Figure 8: Fraction of Important Papers



Note: The non-linear trends of the Fraction of Important Papers Ratios of Tier 2 and Top Field is significantly different at the 1% (F-stat: 54456.45; p-value: 0.000). We found a structural break using a Supremum Wald test in 1999 (swald stat.: 38.58; p-value: 0.000) for Tier 2 and a break in 2011 (swald stat.: 39.35; p-value: 0.000) for Top Field.

economics might be explained by their capacity to identify and publish in popular topics/fields. Moreover, the convergence of the impact factors of field journals might be driven by different trends of popularity.

To control for these factors, we first define fields using the first two digits of the JEL codes and compute the share of each field in each article.[18] Then, we regress the citation of an article in a year on the share each field, year dummies and interaction terms between year dummies and field shares. The residuals from the described regression are citations after partialling out the effect of changes of fields on citations over time. We compute the impact factor of every journal, as described in Section 2.2, using the residualized citations and denote the 5-year filtered impact factor as $FIF^5_{i,t}$. We cannot compute the ratios of the filtered impact factor to compare the influence of Tier 2 and Top Field with the Top 5 as in Section 2.2, since the filtered impact factor may take negative values. Instead, we compute the following normalized impact factor

[18]The Web of Science (WoS) does not provide JEL codes for each article, we obtain them by merging our data from the WoS with the EconLit database. The proportion of matched articles was 90%, the rest of the articles were not available in at least one of the databases, in total the number of matched articles is 46,329, corresponding to 17 journals. The JEL classification changed in 1991. For articles before 1991 we matched old JEL codes to new JEL codes on the basis of the code descriptions. A correspondence table between old and new JEL codes can be obtained from the authors on request.

ratio:

$$FIFR^5_{Tier2,t} = 1 + \frac{\sum_{i \in Tier2} \frac{FIF^5_{i,t}}{3} - \sum_{j \in Top5} \frac{FIF^5_{j,t}}{5}}{\sum_{j \in Top5} \frac{IF^5_{j,t}}{5}}. \tag{9}$$

This normalization has the convenient feature that, $FIFR^5_{i,t} = IFR^5_{i,t}\ \forall i$, if field changes do not matter. On the other hand, if filtering whipes out all differences of impact between journals, then the filtered impact factor ratio equals 1.

Similarly, for Top field journals:

$$FIFR^5_{TopField,t} = 1 + \frac{\sum_{i \in TopField} \frac{FIF^5_{i,t}}{9} - \sum_{j \in Top5} \frac{FIF^5_{j,t}}{5}}{\sum_{j \in Top5} \frac{IF^5_{j,t}}{5}}. \tag{10}$$

Figure 9a presents the filtered impact factor ratios of Tier 2 and Top Field. The results show that the trends documented in Section 2.2 holds when we account for changes in the field of research of journals. There is a significant decline in the filtered impact factor ratio of the Tier 2 and Top Field journals in the period from 1980 until 1997: the impact factor ratio of Tier 2 to Top 5 dropped from 0.76 to 0.47, while that of Top Field to Top 5 declined from 1.03 in 1980 to 0.55. However, the filtered impact factor ratio is substantially larger over the entire sample period than the impact factor ratio documented in Section 2.2, providing evidence that changes in field play an important role in explaining the increase in influence of Top 5. Another important difference with respect to the results of the raw impact factor ratios is that the upward trends for Tier 2 after 1997 is absent in the filtered impact factor ratio. This suggest that the rebound of the Tier 2 journals is largely driven by changes in field popularity.

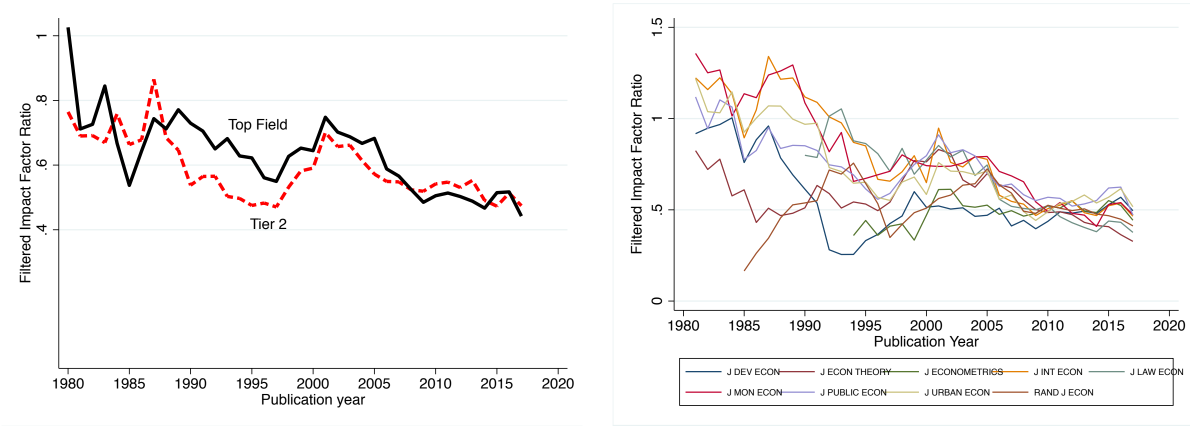
Figure 9b plots the filtered impact factor ratio of Top Field journals. It shows that the convergence of the impact factors of field journals documented in Section 2.2 is not driven by changes in fields.

The influence of a journal might also be determined by the age of the journal. Older journals had more time to establish their reputation and could receive a higher number of citations than newer journals. We check if the main trends documented in Section 2.2 are robust to account for the age of the journal. We first define the age of the journal as the difference between the year of analysis and the year of the first issue of the journal.[19] Then, we compute a filtered impact factor by regressing the impact factor of the journal on dummy variables for age, and take the residuals as the filtered series.[20] After that, we apply the normalization described in Equations (9) and (10) to the filtered impact factor. The results presented in Figure 10a shows that the

[19]The average age for Top 5, Tier 2 and Top Field are 86, 74, and 27, respectively.

[20]The sample is restricted to journals younger than 51 years, since very few journals are older than 50 years and the age dummies would act as journal fixed effects.

Figure 9: Influence Evolution: accounting for field effects over time



(a) Influence Gap

(b) Filtered impact factor per journal

The non-linear trends of the Filtered Impact Factor Ratios of Tier 2 and Top Field are all significantly different at the 1% (p-value: 0.000). We found a structural break using a Supremum Wald test in 2001 (p-value: 0.000) for Tier 2 and a break in 2001 (p-value: 0.000) for Top Field.

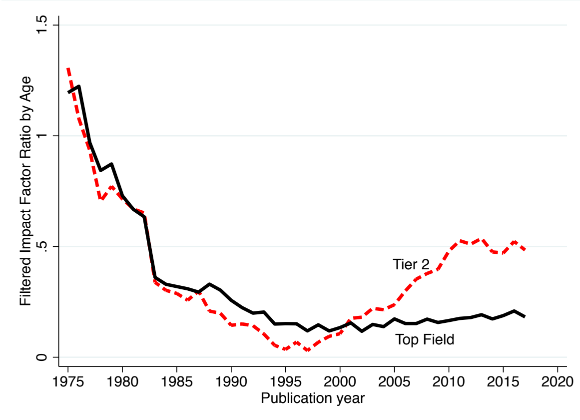
main trends documented in Section 2.2 holds after accounting for the age of the journal. We also find that the convergence of the impact factors of field journals documented in Section 2.2 is not driven by changes in fields (see Figure 10b).

3.3 Time varying classification of economics journals

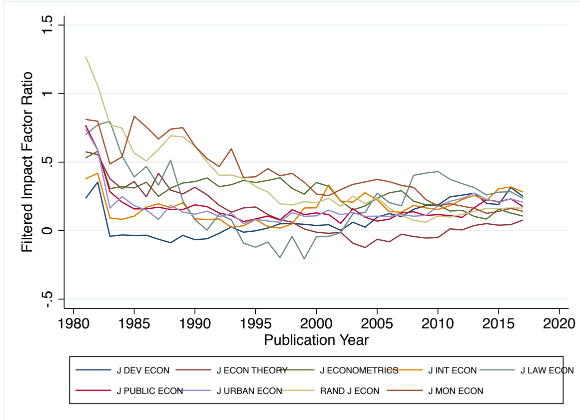
We have considered so far a fixed classification of journals, as used by Ellison (2002). However, the list of top journals is likely to change over time. For example, since 2002 the economic profession has seen a lot of changes. In particular, recently the American Economic Association and the Econometric Society, (publishers of two Top 5 journals, namely American Economic Review and Econometrica), introduced new broad field journals with the aim to fill the gap between Top 5 and Top Field journals. These are the American Economic Journals (Microeconomics, Macroeconomics and Applied Economics), Theoretical Economics and Quantitative Economics. Also, the European Economic Association introduced its own journal, the JEEA, with the aim to publish at the level of Top 5 journals. This raises some interesting questions: How are these new journals performing? And are our main observations on journal influence trends robust if we take the dynamism of top journals into account?

We first briefly study the trends in citations of these prominent new journals that have been introduced over the past two decades. We present the evolution of their impact factor ratio of the new influential economics journals that appeared in the 2000s. Figure 11a 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

Figure 10: Influence Evolution: accounting for the age of the journal

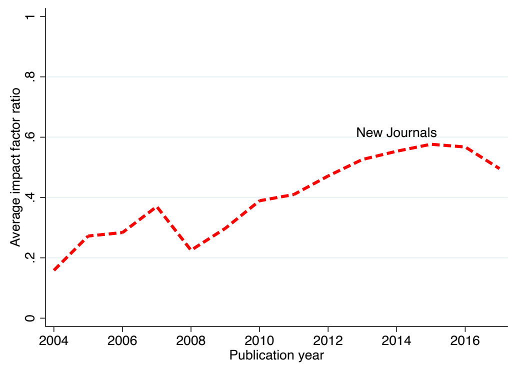


(a) Influence Gap

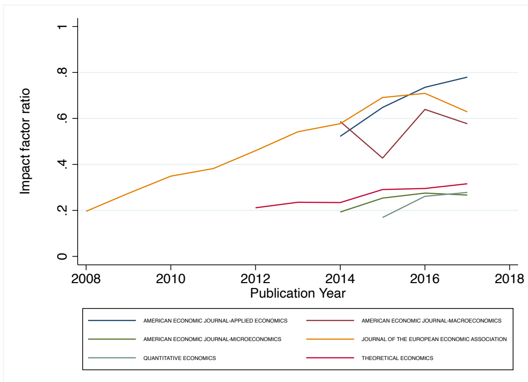


(b) Filtered impact factor per journal

The non-linear trends of the Article Influence Score Ratios and the Impact Factor Ratios of Tier 2 and Top Field are all significantly different at the 1% (F-stat: 6.71; p-value: 0.000) and 1% (F-stat: 16.16; p-value: 0.000), respectively. For the Article Influence Score Ratio, we found a structural break using a Supremum Wald test in 1994 (swald stat.: 125.26; p-value: 0.000) for Tier 2 and a break in 2011 (swald stat.: 85.14; p-value: 0.000) for Top Field. For the Impact Factor Ratio, we found a structural break using a Supremum Wald test in 2011 (swald stat.: 393.35; p-value: 0.000) for Tier 2 and a break in 1990 (swald stat.: 60.68; p-value: 0.000) for Top Field.



(a) Influence Gap



(b) Impact factor ratio per journal

Figure 11: Journals appearing in 2000s

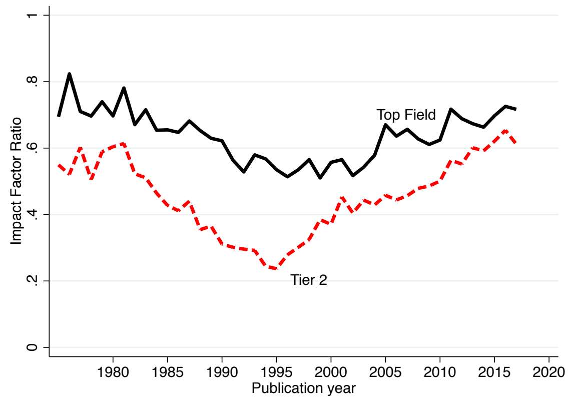
in 2016. Two journals contributed to this upward trend (see Figure 11b), the Journal of the European Economic Association and the American Economic Journals Applied-Economics, both journals present an upward trend in contrast to the downward trend of the historical Top Field during the same period. The Journal of the 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. Note that the IFR of these two journals is much higher than those reported for Tier 2 (0.49 in 2017) and Top Field (0.36 in 2017) in Figure 1.

The high influence of the new journals suggest that it is important to consider a dynamic list of top journals. Therefore, we check if our results are robust to a time varying classification of economics journals. In particular, we classify the Tier 2 journals in year t as the three generalist journals with the highest impact factor from the following list: *Cambridge J. Economics*, *Canadian Journal of Economics*, *Economic Inquiry*, *Economic Journal*, *Economics Letters*, *Economic Policy*, *European Economic Review*, *European J. Political Economy*, *International Economic Review*,*Journal of the European Economic Association*, *Oxford Economics Paper*, *Review of World Economics*, *Scandinavian Journal of Economics*. We also categorize the Top Field journals in year t as the nine field journals with the highest impact factor at year t. The field journal list includes the 100-Journals, excluding the journals listed above, Top 5, Business and Finance journals. We also add to the field journal list the American Economic Journals Microeconomics, Theoretical Economics and Quantitative Economics.

Figure 12 shows the results for the dynamic list of top journals. Similar as with the constant list of journals, the influence gap between Top 5 and the other top journals increased before 1995. Specifically, the impact factor ratio of Tier 2 declined from 0.55 in 1975 to 0.23 in 1995 and the impact factor ratio of Top Field decreased from 0.69 in 1975 to 0.54. After that, there was a reversal, and the influence gap between Top 5 and the other top journals decreased substantially, specially for Tier 2 journals, that had an impact factor ratio in 2017 of 0.61. Contrary to the trend in the impact factor ratio of the fixed classification of journals, the figure shows that the gap between Top 5 and Top Field also decreased after 1995, the impact factor ratio of Top Field was 0.71 in 2017.

We next analyze the drivers of the increase in the influence of Top Fields journals after 1995 in the dynamic classification of Top Field journals presented in Figure 12. For that purpose, we take a look at our dynamic list of Top Field journals. Columns 2, 3 and 4 of Table 2 report this list of Top Field journal for the years 1977, 1997 and 2017, using the Top Journals data set. We observe that the list in 2017 is very different than that of 1977 and 1997. In fact, the overlap

Figure 12: Influence Evolution: time varying classification of journals



Note: The non-linear trends of the Filtered Impact Factor Ratios of Tier 2 and Top Field are all significantly different at the 10% (F-stat: 3.06; p-value: 0.0507). We found a structural break using a Supremum Wald test in 2011 (swald stat.: 61.83; p-value: 0.000) for Tier 2 and a break in 1996 (swald stat.: 147.60; p-value: 0.000) for Top Field.

consists of one journal: the Journal of Human Resources, while there is actually no overlap with the fixed list of Top Field journals, used in Section 2!

When we look at the list of Top Field in 2017 (column 4), we indeed observe two new AEJ journals. Of the other 7 journals, we note that 6 of them have a interdisciplinary character, operating on the boundaries of the economic discipline. The appearance of these interdisciplinary journals in the list raises the question whether the trends in Figure 12 might be driven by interdisciplinary citations. To investigate this, we repeat the analysis using the 100-Journals data set. This data set contains citations made in 100 economic journals only, and hence, calculates impact factor using intradisciplinary citations only.

Columns 5, 6 and 7 of Table 2 show the list of Top Field journals for the 100-Journals data set in 1977, 1997 and 2017. In these lists, there are indeed fewer interdisciplinary journals. There is still remarkably little overlap, with only the Journal of Monetary Economics a solid member of the Top Field list for 40 years. This volatility in the list illustrates the importance in using a dynamic list of top journals.

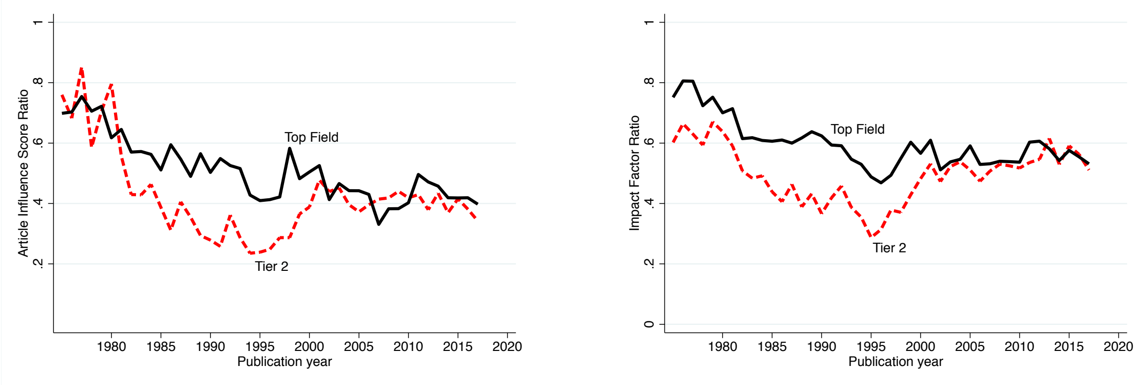
We finally check if the increase in influence of Top Fields journals holds once we consider the citations from the 100-Journals data set only. We look both at the Impact Factor and the Article Influence Score, presented in Section 3.1. The results presented in Figure 13 show that the decline in influence of Tier 2 and Top Field journals holds after accounting for the influence of the citing journal, but the increase in influence of Top Field journals after 1995 disappears. The increase in influence of Tier 2 after 1995 is also less pronounced when using the Article Influence Score ratio than when using the Impact Factor ratio. Overall, these findings show that

Table 2: The Top Field journals in 1977, 1997, and 2017, according the time varying classification of journals

	Top Journals data set			100-Journals data set		
	1977	1997	2017	1977	1997	2017
AEJ - Applied Economics			X			X
AEJ - Macroeconomics			X			X
Energy Economics			X			X
Energy Policy			X			
Ecological Economics			X			
Economic Theory				X		
Games & Economic Behavior					X	
Journal of Applied Econometrics					X	
Journal of Bus. & Econ. Stat.		X			X	
Journal of Economic Growth			X			X
Journal of Economic Theory	X			X	X	
Journal of Econometrics		X		X	X	
Journal of Environ. Econ. & Manag.	X	X			X	X
Journal of Health Economics		X				
Journal of Human Resources	X	X	X			X
Journal of International Economics	X			X		X
Journal of Labor Economics			X			X
Journal of Law & Economics	X	X				
Journal of Law, Econ., & Organ.		X				
Journal of Monetary Economics	X	X		X	X	X
Journal of Money, Credit & Banking				X		
Journal of Public Economics	X			X		
Journal of Urban Economics	X			X		
RAND Journal of Economics	X	X		X	X	
Research Policy			X			
World Bank Economic Review					X	

Notes: An X denotes that the journal was part of the list of 9 Top Field journals in the given year. AEJ = American Economic Journal. Journal of Bus. & Econ. Stat.=Journal of Business & Economic Statistics. Journal of Environ. Econ. & Manag.= Journal of Environmental Economics & Management. Journal of Law, Econ. & Organ. = Journal of Law, Economics, & Organization.

Figure 13: Influence Evolution: time varying classification of journals. Citations from the 100-Journals database.



(a) Article influence score ratio.

(b) Impact factor ratio.

Note: The Article Influence Score Ratios of Tier 2 and Top Field are all significantly different at the 1% level (F.stat: 7.06; p-value: 0.000). The Impact Factor Ratios of Tier 2 and Top Field are all significantly different at the 1% level (F.stat: ; p-value: 0.000). For the Article Influence Score Ratio we found a structural break using a Supremum Wald test in 1994 (swald stat.: 125.26; p-value: 0.000) for Tier 2 and a break in 2011 (swald stat.: 129.39; p-value: 0.000) for Top Field. For the Impact Factor Ratio we found a structural break using a Supremum Wald test in 1995 (swald stat.: 81.84; p-value: 0.000) for Tier 2 and a break in 1990 (swald stat.: 75.64; p-value: 0.000) for Top Field.

the rebound of Top Field journals, documented in Figure 12, is mainly driven by field journals that are receiving citations from outside the economic discipline.

4 A model of journals as platforms

There is a mass of authors spread across research fields. Authors get ideas for papers; the ideas are of different quality. Authors 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. 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. Every author reads the journal in his field and a fraction of authors also read the general interest journal.[21]

There is a set of fields of research, $\mathscr{F} = \{1, 2, \ldots, F\}$. 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 $n_g = \sum_{f \in \mathscr{F}} \alpha_f n_f$.

[21]The assumption of exogenous readers is made for expositional simplicity. We also discuss the implications of allowing authors to choose journals later in this section.

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

$$t_f := t_f(d) = \inf \left\{ w \in \mathbb{R}_+ \;\middle|\; n_f \int_w^\infty \mathbb{1}_{d_f(v)=f} h(v) dv \leq \kappa_f \right\} \tag{11}$$

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

$$t_g := t_g(d) = \inf \left\{ w \in \mathbb{R}_+ \;\middle|\; \sum_{f \in \mathcal{F}} n_f \int_w^\infty \mathbb{1}_{d_f(v)=g} h(v) dv \leq \kappa_g \right\} \tag{12}$$

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:

$$A_f\left(d\right) = \frac{n_f \int_{t_f(d)}^\infty \mathbb{1}_{d_f(v)=f} \; v h(v) dv}{n_f \int_{t_f(d)}^\infty \mathbb{1}_{d_f(v)=f} h(v) dv} \tag{13}$$

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

$$A_g(d) = \frac{\sum_{f\in\mathcal{F}} n_f \int_{t_g(d)}^{\infty} \mathbb{1}_{d_f(v)=g}\ vh(v)dv}{\sum_{f\in\mathcal{F}} n_f \int_{t_g(d)}^{\infty} \mathbb{1}_{d_f(v)=g} h(v)dv}. \tag{14}$$

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

$$n_g = \sum_{f\in\mathscr{F}} \alpha_f n_f \tag{15}$$

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:

$$U_f(v_i|d) = \begin{cases} n_f A_f(d) & \text{if } v_i \geq t_f(d) \\ -1 & \text{otherwise.} \end{cases} \tag{16}$$

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

$$U_g(v_i|d) = \begin{cases} n_g A_g(d) & \text{if } v_i \geq t_g(d) \\ -1 & \text{otherwise.} \end{cases} \tag{17}$$

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

$$\max_{j\in\{f,g,\emptyset\}} \quad U_j(v_i|d), \tag{18}$$

The corresponding reaction function is

$$p_f(v_i|d) = \operatorname*{argmax}_{j\in\{f,g,\emptyset\}} \quad U_j(v_i|d) \tag{19}$$

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.,

$$\sum_{f \in \mathcal{F}} n_f \int_{t_g(d)}^{\infty} \mathbb{1}_{d_f(v)=g} h(v) dv = \kappa_g \tag{20}$$

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,

$$\frac{A_f(d)}{A_g(d)} < \frac{n_g}{n_f}. \tag{21}$$

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

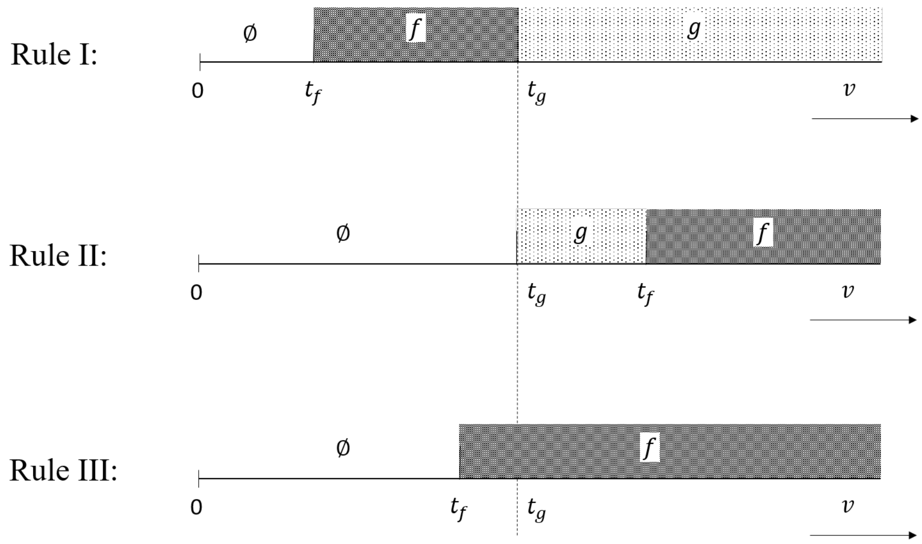


Figure 14: Three possible cases of author submission rules in equilibrium

that $n_f A_f(d) \geq n_g A_g(d)$, or equivalently,

$$\frac{A_f(d)}{A_g(d)} \geq \frac{n_g}{n_f}. \tag{22}$$

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 14.

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.

Proposition 1. *Suppose that* $\forall f \in \mathscr{F} : n_f = n, \kappa_f = \kappa$, *and* $\alpha_f = \alpha$. *There exist numbers* K_1

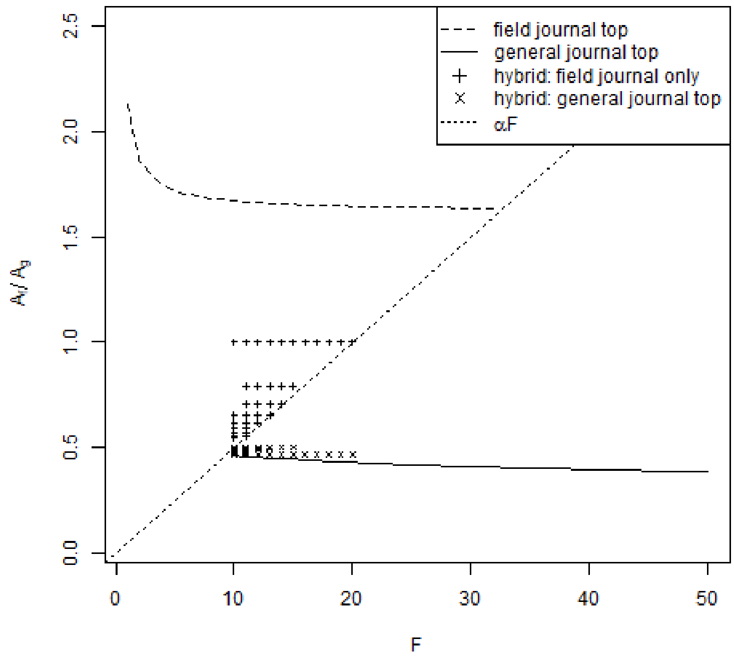


Figure 15: Journal Influence Ratio and Number of Fields

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 $K_2 > 1$.*
2. *If $\alpha F > K_2$, the unique equilibrium involves every field using decision rule I. The journal impact ratio lies on the interval $[K_1, 1)$.*
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 of Figure 15. 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).

In the model, we assumed that a fraction α of authors read the general journal. This fraction was kept fixed, and was independent of the quality of journals. It would be natural to suppose that authors in a field have some degree of flexibility about how much time they spend on the general journal. One way to do this would be to say that authors care about the quality of the articles they read and that they have a degree of freedom on how much time to allocate to the general journal, say that the time interval is given by $[\alpha_L, \alpha_H]$. We will not go into the details of the formulation and the derivation here but it is possible to show that the arguments we have developed can be extended to this more general setting. The inequalities we developed on the thresholds for different types of equilibrium will be suitably modified. The threshold value of number of fields will be suitably lowered to ensure that the field journal is dominant is the unique outcome (and suitably raised for the dominant general journal to be the unique outcome).

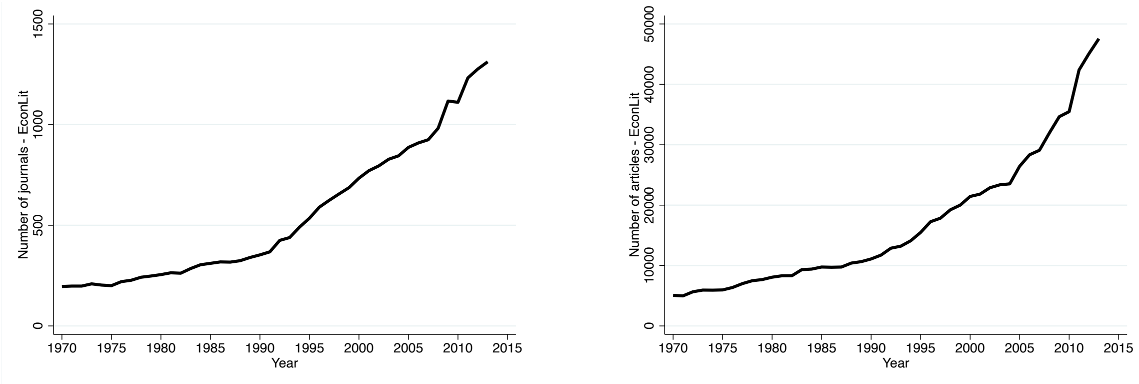
We conclude with a brief remark on welfare. In this modified model, there is probably a welfare enhancing aspect to a clear ranking of general journals. As a discipline grows both horizontally and in terms of the depth of technical difficulty across fields, general journals potentially allow authors in a field to keep abreast of latest developments in the discipline more broadly.[22]

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 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 these

[22]We are grateful to Navin Kartik for drawing our attention to the importance of these considerations. The discussion here also draws on the comments of Angus Deaton at the 2017 AEA Panel.



(a) Number of Journals

(b) Number of Articles

Figure 16: Growth of Economics: 1970-2013. Source: EconLit

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 16 presents data on the number of journals listed in EconLit and the number of articles published in those journals every year.[23] 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 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 dominated space, further increases in number of fields has a small effect on the ratio, see Figure

[23]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.

14. 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).

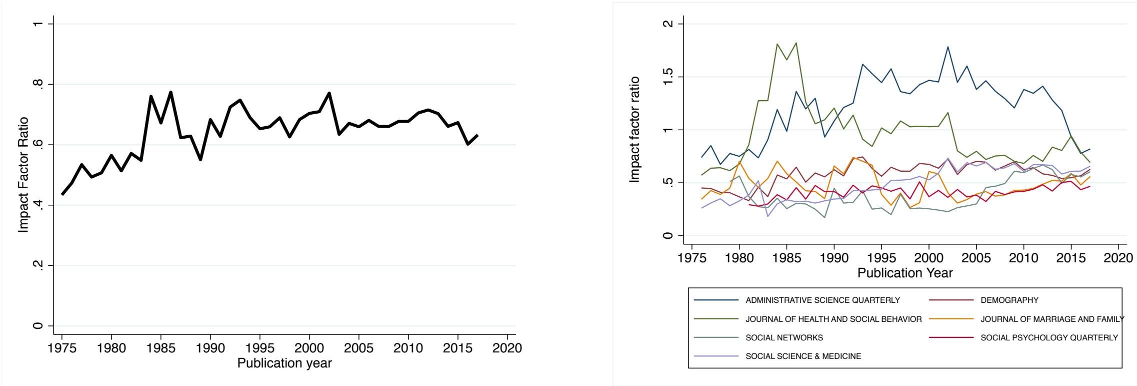
Turning, finally, to the Tier 2 journals after 1995, the main observation is that the journal influence ratio recovered. The model does not explicitly consider Tier 2 general journals, but we believe that the discussion on field journals is helpful to understand this recovery. The number of Tier 2 journals remained constant until fairly recently. 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 two top General Journals – American Journal of Sociology and American Sociological Review – and 7 top field journals – Administrative Science Quarterly, Demography, Journal of Health and Social Behavior, Journal of Marriage and Family, Social Networks, Social Psychology Quarterly, Social Science & Medicine over the period 1970-2017.[24] The total number

[24]For robustness, we also consider Social Forces as an additional top General Journal. The results are qualitatively the same and are available upon request.



(a) Field versus General Journal

(b) Individual Field Journals

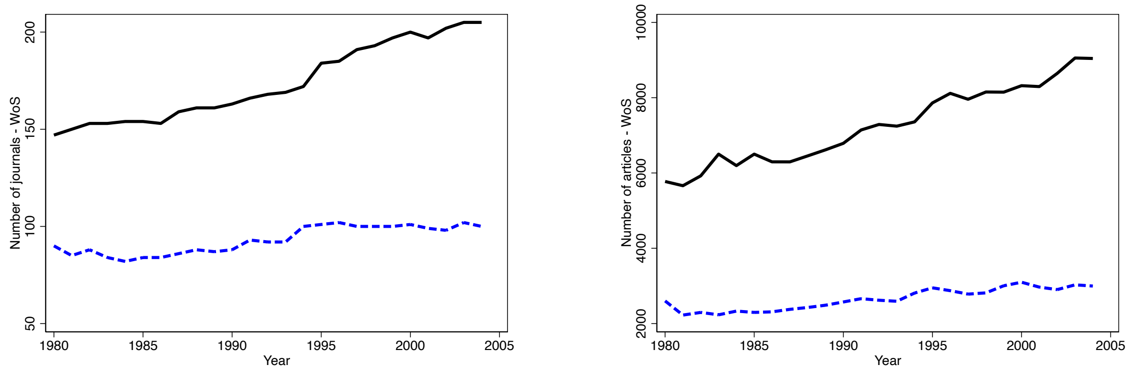
Figure 17: Journal Influence in Sociology

of articles is 41278. The data on citation counts and references is taken from the WoS. We first present in Figure 17a the evolution of the average impact factor ratio of Top Field journals relative to the Top 2 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 2 journals, the impact factor ratio increased from 0.44 in 1975 to 0.65 in 1995 and then it remained relatively stable till 2017. Figure 17b 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 1.66 in 1975 to 4.95 in 1995, when the impact factor ratio of Administrative Science Quarterly was almost double the average impact factor of the Top 2 journals.[25]

Thus the trends in sociology were quite different as compared to economics. How can we account for this difference? We relate the developments in sociology to aspects of our model. The first point concerns growth in discipline: Figure 18 suggests that until 1995, there was only modest growth in the overall scale of the research in sociology (as compared to economics).[26] Second, there also appears to have been no large scale change in the broader intellectual environment comparable to economics. Indeed, Fourcade, Ollion, and Algan (2015) and Angrist, Azoulay, Ellison, Hill, and Lu (2020) show that economics is relatively more insular as compared to the other social sciences. In particular, Fourcade, Ollion, and Algan (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 rarely cite research outside economics. We interpret this as saying that the readership of the general journal is low

[25] 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.

[26] 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 18: Sociology versus Economics: 1980-2004. Source: Web of Science.

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 the Economic Journal and 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 and American Sociological Review – 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. This models highlights the role of two factors – the growth in scale of economics research and greater readership of the general journal – in leading to the dominance of general journals. 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 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, on a citation based measure, the quality of top general journals in economics has remained stable, while their prestige appears to have grown significantly. Is the market value of a paper in a Top 5 general journal now out of line with its intellectual contribution?

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

63. J. Industrial Economics
64. J. International Business Studies
65. J. International Economics
66. J. International Money and Finance
67. J. Labor Economics
68. J. Law & Economics
69. J. Law Economics & Organization
70. J. Monetary Economics
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 17 journals. Heckman and Moktan (2020) investigate how top articles are distributed over the economic journals, that is: What is the fraction of top articles, say the Top 5% , that appears in American Economic Review, Econometrica, etcetera? Their measure of a top article is based on the total number of citations of the article accumulated from the year of publication to 2018. They control for exposure effects (i.e. old articles have more time to accumulate citations than recently published articles) by using residuals obtained from estimating an OLS regression of log citations on a third-degree polynomial for the number of years elapsed between the year of publication and 2018. Instead, in order to compare between decades, we use the Top-Journals data set, and measure citations accumulated from the year of publication t to $t + 9$ to group articles into four performance-based bins: articles with the Top 25%, Top 10%, Top 5%, and Top 1% of 10-years citations. This 10-years citations control for the year of publication of the article.

It is also important to compare the proportion of influential articles of a journal relative to the journal's total volume of publications. We follow Heckman and Moktan (2020) and consider a volume-adjusted proportion of influential articles. The adjustment discounts the contribution of high-volume journals by the number of articles published by a journal j in a year t relative to the total number of articles published in that year t. This adjustment account for the higher probability of receiving citations associated with publishing a larger volume of articles. For further details about the adjustment, please see footnote 62 in Heckman and Moktan (2020).

The tables below are read as follows. For example, Table 3, shows how the top 25%, top 10%, etc., articles published in the list of 17 journals between 1970 and 1979, measured by the number of citations in the first 10 years of their existence, is distributed among the 17 journals. The first number shows that 11.2% of the top 25% articles published in one of the 17 journals in the 1970s appeared in the Journal of Urban Economics, adjusting for differences in journal capacity. Note that the numbers in each column sum up to 100.

Table 3: Volume-Adjusted Proportion of Influential Articles by Individual Journals: 1970–1979

Rank	Journal	Top 25%	Journal	Top 10%	Journal	Top 5%	Journal	Top 1%
1	RAND	10.9	**JPE**	11.8	**JPE**	13.6	JME	25
2	JUE	10	**AER**	9.1	JME	10.9	**JPE**	17.1
3	JET	7.7	JME	8.6	RAND	10.9	RAND	13.4
4	**JPE**	7.5	ReStud	7.9	**AER**	10.6	**AER**	11.4
5	**AER**	7.2	JET	7.8	**ReStud**	7	JLE	7.2
6	JPub	7.1	JLE	6.9	JET	6.9	**ECMA**	7
7	**ReStud**	6.9	JUE	6.8	JPub	6.4	JET	5.8
8	IER	6.4	JPub	6.8	**ECMA**	6.3	ReStud	4.7
9	ReStat	6.4	RAND	6.4	JLE	5.9	IER	3.7
10	JLE	6.4	ReStat	6.1	**QJE**	5.3	**ReStat**	2.4
11	**QJE**	5.6	**QJE**	5.9	ReStat	4.5	**QJE**	1.2
12	JME	4.9	**ECMA**	5.8	IER	3.1	EJ	1
13	**ECMA**	4.6	IER	3.9	JUE	2.9	JUE	0.0
14	JIE	4.0	JIE	3.6	JIE	2.7	JIE	0.0
15	JDE	2.9	JDE	1.5	JDE	1.6	JPub	0.0
16	EJ	1.3	EJ	1.1	EJ	1.3	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 4: Volume-Adjusted Proportion of Influential Articles by Individual Journals: 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

Table 5: Volume-Adjusted Proportion of Influential Articles by Individual Journals: 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 6: Volume-Adjusted Proportion of Influential Articles by Individual Journals: 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

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.

Table 7: Volume-Adjusted Proportion of Influential Articles by Individual Journals: 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

Consider first an equilibrium in which all the fields use decision rule I, so, $C = F$. In equilibrium the capacity constraint of the general journal is binding. So it follows that $t_g(d)$ must solve $nF\,(1 - H(t_g(d))) = \kappa_g$. Simplifying and rearranging terms yields:

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

From equation (14), and noting that the denominator equals capacity κ_g, it follows that the expected quality of the general journal is

$$A_g(d) = \frac{nF}{\kappa_g} \int_{\tilde{t}_g(F)}^{\infty} vh(v)\; dv =: \tilde{A}_g(F) \tag{24}$$

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:

$$n\left(H(\tilde{t}_g(F)) - H(t_f(d))\right) = \kappa. \tag{25}$$

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

$$t_f(d) = H^{-1}\left(1 - \frac{\kappa_g}{nF} - \frac{\kappa}{n}\right) =: \tilde{t}_f(F). \tag{26}$$

The expected quality of every field journal is

$$A_f(d) = \frac{n}{\kappa} \int_{\tilde{t}_f(F)}^{\tilde{t}_g(F)} vh(v)\ dv =: \tilde{A}_f(F) \tag{27}$$

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.,

$$\alpha F > \frac{\tilde{A}_f(F)}{\tilde{A}_g(F)} \tag{28}$$

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 $n\,(1 - H(t_f(d))) = \kappa$. Simplifying, and rearranging, yields

$$t_f(d) = H^{-1}\left(1 - \frac{\kappa}{n}\right) =: \bar{t}_f. \tag{29}$$

It follows that the expected quality of a field journal is

$$A_f(d) = \frac{n}{\kappa} \int_{\bar{t}_f}^{\infty} vh(v)\ dv =: \bar{A}_f. \tag{30}$$

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

$$nF\left(H(\bar{t}_f) - H(t_g(d))\right) = \kappa_g \tag{31}$$

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

$$t_g(d) = H^{-1}\left(1 - \frac{\kappa F + \kappa_g}{nF}\right) =: \hat{t}_g(0) \tag{32}$$

The expected quality of the general journal is given by

$$A_g(d) = \frac{nF}{\kappa_g} \int_{\hat{t}_g(0)}^{\bar{t}_f} vh(v)\ dv =: \hat{A}_g(0) \tag{33}$$

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.,

$$\alpha F \leq \bar{A}_f / \hat{A}_g(0). \tag{34}$$

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:

$$t_g(d) = H^{-1}\left(1 - \frac{\kappa(F - C) + \kappa_g}{nF}\right) =: \hat{t}_g(C). \tag{35}$$

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

$$t_f(d) = H^{-1}\left(1 - \frac{\kappa(2F - C) + \kappa_g}{nF}\right) =: \hat{t}_f(C) \tag{36}$$

. 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

$$\frac{A_f(d)}{A_g(d)} = \frac{\hat{A}_f(C)}{\hat{A}_g(C)} \tag{37}$$

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

$$\frac{A_f(d)}{A_g(d)} = \frac{\bar{A}_f}{\hat{A}_g(C)}. \tag{38}$$

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.,

$$\frac{\hat{A}_f(C)}{\hat{A}_g(C)} < \alpha F \leq \frac{\bar{A}_f}{\hat{A}_g(C)}. \tag{39}$$

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: $nC\,(1 - H(t_g(d))) = \kappa_g$. Simplifying and solving yields $t_g(d) = H^{-1}\left(1 - \frac{\kappa_g}{nC}\right) = \tilde{t}_g(C)$ as in (23).

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

$$\frac{A_f(d)}{A_g(d)} = \frac{\tilde{A}_f(C)}{\tilde{A}_g(C)} \tag{40}$$

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

$$\frac{A_f(d)}{A_g(d)} = \frac{\bar{A}_f}{\tilde{A}_g(C)}. \tag{41}$$

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

$$\frac{\tilde{A}_f(C)}{\tilde{A}_g(C)} < \alpha F \leq \frac{\bar{A}_f}{\tilde{A}_g(C)}. \tag{42}$$

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 (28), (34), (39) and (42) 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 (28), (39) and (42):

$$K(C) = \begin{cases} \hat{A}_f(C)/\hat{A}_g(C) & \text{if } 0 \leq C < \frac{\kappa_g}{\kappa} \\ \tilde{A}_f(C)/\tilde{A}_g(C) & \text{if } \frac{\kappa_g}{\kappa} \leq C \leq F \end{cases} \tag{43}$$

Then

$$K_1 = \min_{C \in \{1,\dots,F\}} K(C). \tag{44}$$

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 $C \in \{0, \dots, F-1\}$ is always

$$K_2 = \frac{\bar{A}_f}{\hat{A}_g(0)}. \tag{45}$$

Note that if every field uses decision rule II, then the journal impact ratio is $\frac{\bar{A}_f}{\hat{A}_g(0)} = K_2$, see (30) and (33). By definition of decision rule II, $\bar{A}_f > \hat{A}_g(0)$, hence, $K_2 > 1$. On the other hand, if every field uses decision rule I, then the journal impact ratio is $\frac{\tilde{A}_f(F)}{\tilde{A}_g(F)} \geq K_1$, see (27), (24) and (44). By definition of decision rule I, $\tilde{A}_g(F) > \tilde{A}_f(F)$, hence, the journal impact ratio is in this case smaller than 1.

This completes the proof.

■